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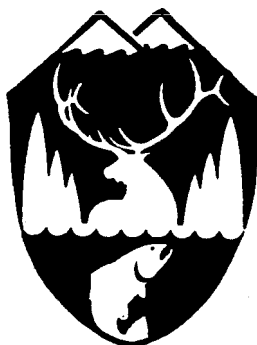
DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION

Job Performance Report

Project F-71-R-14



REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 4-a.	Region 4 Mountain Lakes Investigations
Job No. 4-b.	Region 4 Lowland Lakes and Reservoirs Investigations
Job No. 4-c.	Region 4 Rivers and Streams Investigations
Job No. 4-d.	Region 4 Technical Guidance

By

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JOB PERFORMANCE REPORT

State of: Idaho Name: Regional Fishery Management
Investigations
Project No: F-71-R-14 Title: Region 4 Mountain Lakes
Job No.: 4-a Investigations
Period Covered: July 1, 1989 to June 30, 1990

ABSTRACT

Regional personnel stocked Big Lost and Independence No. 2 Lakes with Arctic grayling fingerlings. Angling sampling on the day of stocking found that Arctic grayling released in the lakes in 1987 ranged from 303 to 331 mm. Sampling in Window Lake found evidence of natural reproduction and slow growth rates for cutthroat trout.

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OBJECTIVES

To maintain information for fishery management activities and decisions for mountain lakes.

METHODS

Information on fish populations in four mountain lakes in Region 4 was collected by using distance compensating ichthyoprobes with artificially simulated food organisms. Lake areas were estimated from USGS 7.5-minute topographic maps. Lake depths were sampled with a Lowrance Fish Lo-K-Tor from a backpack raft. Water samples from the lakes were analyzed the following day with a Hach kit for alkalinity and hardness, and conductivity was sampled with a Solu Bridge conductivity meter.

RESULTS

Window Lake

Window Lake is located in the headwater area of the West Fork of the North Fork Big Wood River, NE1/4, Sec 14, R16E, T6N. It lies in a glacial cirque basin at an elevation of 3,055 m and has an area of about 2 ha. The lake is an oligotrophic lake with an alkalinity level of 20 mg/l, hardness 32 mg/l, conductivity of 80 umhos/cm, and midlake surface water temperature of 12°C on August 15, 1989. Maximum depth measured was 6.4 m (Figure 1). Inlet tributaries are snow-fed and become intermittent by midsummer. Potential stream spawning area for the lake is limited to the outlet stream. There is about 35 m of accessible stream above a falls, with about 50% of the substrate being gravel. Stream width ranges from 0.3 to 1 m.

Due to difficult access, fishing effort is light. Neither of the two accesses into Window Lake are maintained trails. The shortest hike (1.5 km) is a climb over a steep ridge from historical Boulder City, which can be reached by four-wheel-drive over a difficult road, which is not maintained. The lake can also be accessed from the North Fork Big Wood River (6.5 km).

On August 15, 1989, three department anglers fished Window Lake and its outlet for a total of 5.5 hours and caught 28 cutthroat trout Oncorhynchus clarki (5.1/h). A floating experimental gill net fished from 1330 to 1530 did not catch any fish. Fish size ranged from 72 to 365 mm, with an average of 264.8 mm (Figure 2). Mean condition factor (K) for the 21 fish weighed was 0.97, and, for fish over 300 mm, 0.93 (N=15). An angler report from August 16, 1989 also indicated that one 1.8-kg fish was caught, along with others ranging from 80 to 400 mm. A sample of scales from seven department-caught fish showed ages I+, II+, III+, and IV+ fish present. Since the lake is stocked on a three-year cycle (1979, 1982, 1985, and 1988) with 500 cutthroat trout fingerlings, it is apparent that there is some natural reproduction occurring. Based on the

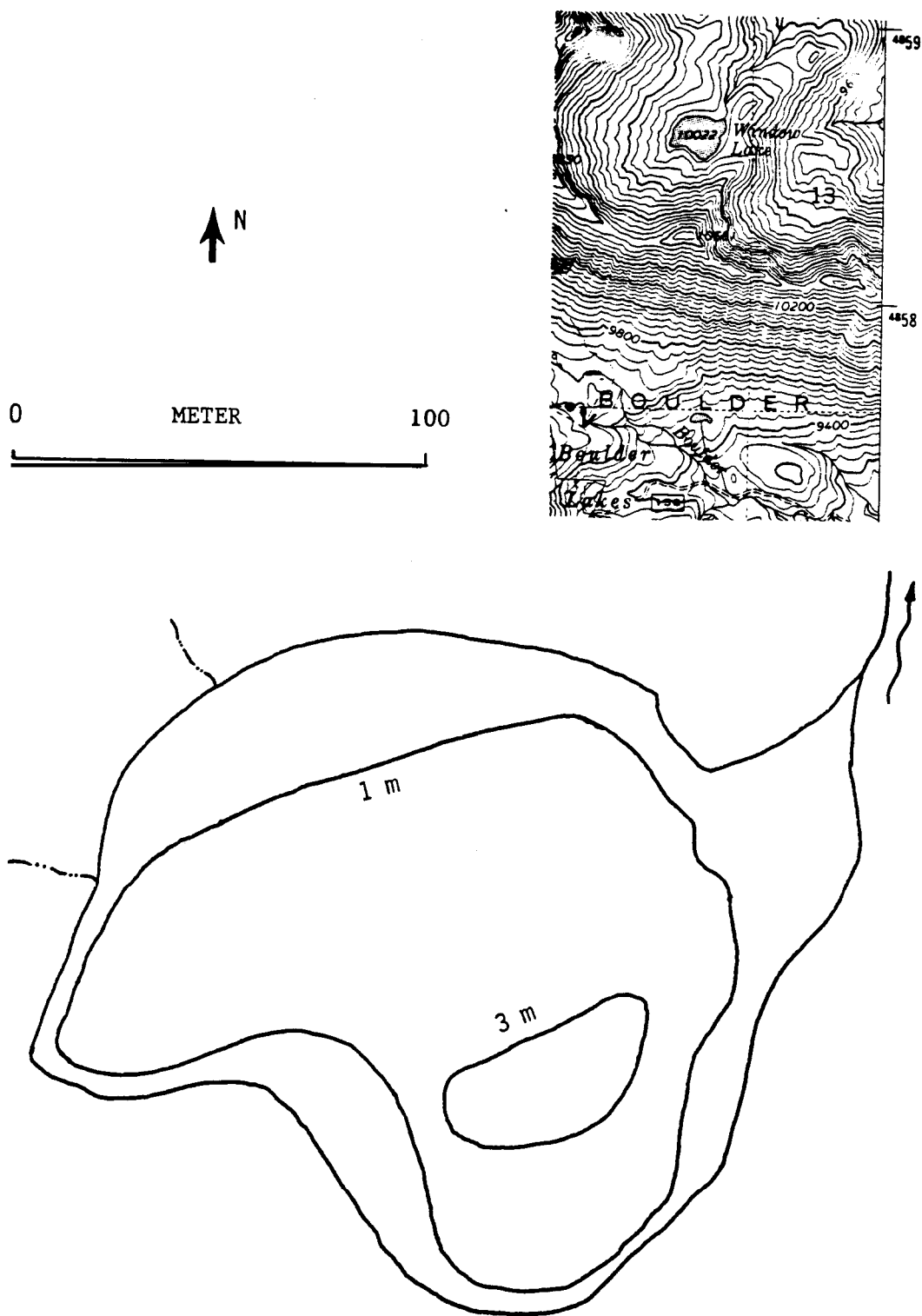


Figure 1. Window Lake, North Fork Big Wood River drainage.

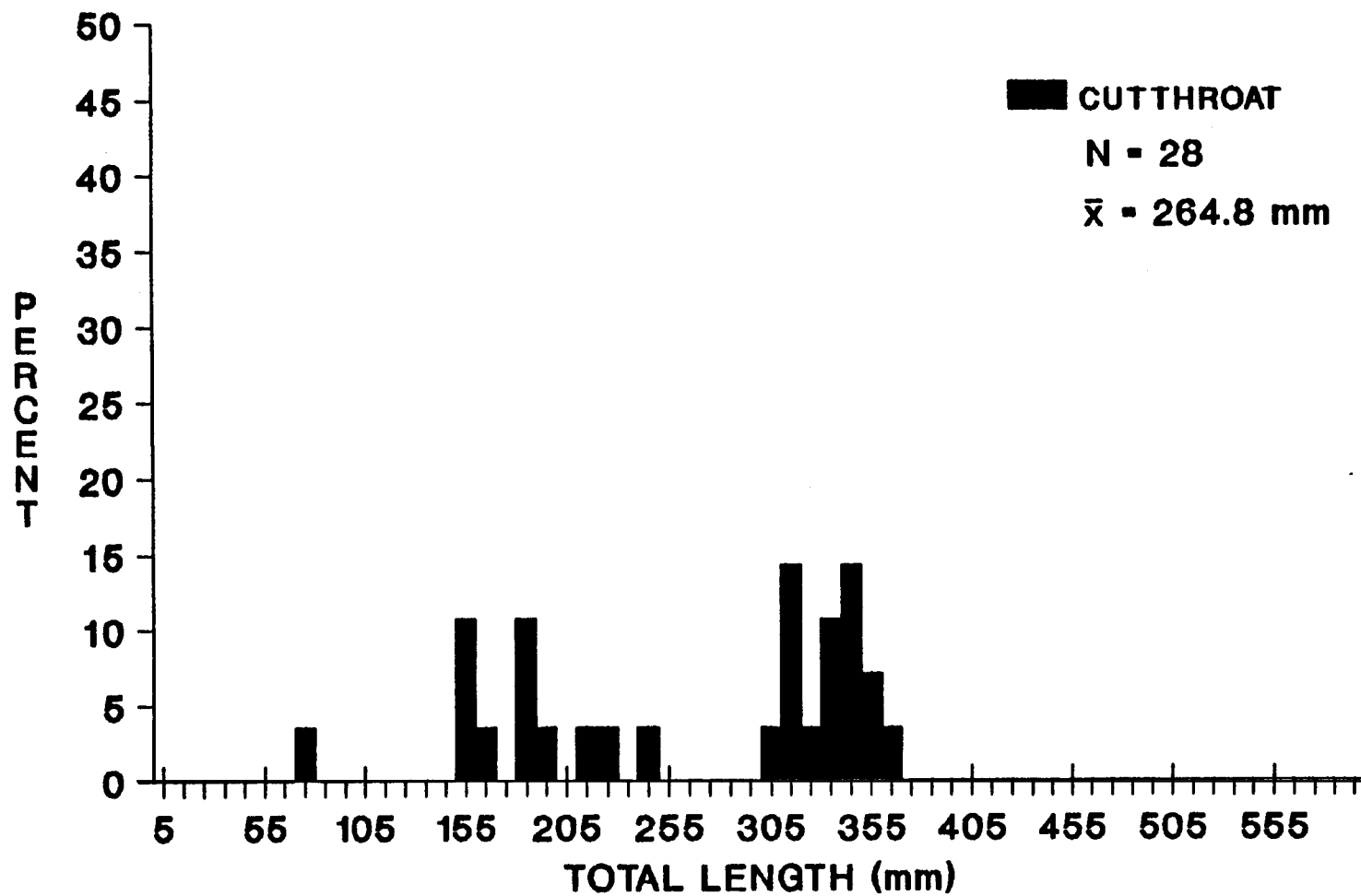


Figure 2. Length frequency of cutthroat trout caught by angling in Window Lake, August 15, 1989.

evidence of natural reproduction and the low condition factors, stocking rates should be reduced to 400 fingerlings **every** three years.

Fiddle Lake

Fiddle Lake is located 0.8 km north of Trinity Mountain (SE1/4, SECT, T3N, R9E) in the headwaters of Rainbow Creek, which is a tributary of Trinity Creek. The lake is in a cirque basin with evergreen trees on all sides. It lies at an elevation of 2,520 m with an area of about 1.2 ha. Lake size and level fluctuates depending on snowpack, and, during low water years, the "handle" of the lake dries up. On August 31, 1989, the handle and all inlets and the outlet were dry.

Fiddle Lake is easily accessible from the road to the Trinity Mountain Lookout. If the gate is closed, it is a 1 km walk to the trail, then a 0.5 km hike from the road down to the lake. The lake can also be accessed by trail from Big Trinity Lake; 3 km.

On August 31, 1989, Fiddle Lake was sampled by two department anglers who fished for two hours and caught nine cutthroat trout and one rainbow trout Oncorhynchus gairdneri (2.5 fish/h). The cutthroat trout averaged 178.4 mm, with a range of 171 to 189 mm. The rainbow trout was 236 mm. The mean condition factor (K) for the cutthroat trout was 1.01 and the rainbow trout, 0.84. All trout observed in the lake were of a similar size. The lake is normally only stocked with 700 fingerling cutthroat trout every three years and was last stocked in 1988 and 1985.

Big Lost Lake

Big Lost Lake (NW1/4, NW1/4, Sec 27, R15E, T14S) is in the headwaters of Norton Creek in the Big Wood River drainage. When full, it is a 2.8 ha lake lying in a glacial cirque basin at tree line. During low water years, the lake loses about 40% of its area and 2 m of depth and is subject to winter kills for trout.

On September 27, 1989, 660 Arctic grayling Thymallus arcticus fingerlings were stocked by back-packing into Big Lost Lake. The lake also received Arctic grayling in 1987 and 1988, and it receives 1,000 cutthroat trout fingerlings every three years (1982, 1985, 1988).

Department anglers sampled Big Lost Lake on September 27, 1989 and caught one Arctic grayling (320 mm, 420 g) and five cutthroat trout (180 to 240 mm) during three hours of fishing (2.0 fish/h).

Independence Lake No. 2

Independence Lake No. 2 is the largest (4.8 ha) of four lakes in the headwaters of Green Creek in the Cassia Creek drainage. It is located in SE1/4,

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SE1/4, Sec 17, R24E, T14S and has evergreens along one edge of the lake. Water level fluctuates considerably depending on snowpack, and in low water years, it loses 3 m of depth and approximately 505 of its area.

On September 27, 1989, 660 Arctic grayling were back-packed into Independence Lake No. 2. The lake received 1,000 grayling in 1987 and 9,000 grayling and 1,000 cutthroat trout in 1988. After releasing the fish, department anglers sampled the lake and caught three Arctic grayling and seven cutthroat trout (3.3 fish/h). The grayling ranged from 303 to 331 mm in length and the cutthroat, 170 to 193 mm. Scales from the grayling indicated that they were II+ fish from the 1987 release.

RECOMMENDATIONS

Reduce the stocking rate in Window Lake from 500 cutthroat trout fingerlings to 400 fingerlings every three years.

JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management
Investigations

Project No: F-71-R-14

Job No.: 4-b

Title: Region 4 Lowland Lakes and
Reservoirs Investigations

Period Covered: July 1, 1989 to June 30, 1990

ABSTRACT

The kokanee population in Anderson Ranch Reservoir in 1989 was estimated to be 629,000 fish, with the age 0+ age class accounting for 99% of the kokanee. Age I+ (1987 year class) kokanee did not appear in the sample. A total of 8,131 spawning kokanee passed the trap on the South Fork Boise River, and the total run was estimated to be approximately 10,000 to 12,000 fish.

Water temperature in Bray Lake on August 22, 1989 was 20°C, and dissolved oxygen levels exceeded 6 mg/l. The fish population consisted mainly of slow-growing channel catfish. In Cow Creek Reservoir, temperature was 18°C and dissolved oxygen levels exceeded 5 mg/l, except on the bottom. Both reservoirs should support trout during summer months if water levels remain sufficient.

Construction of a hydropower facility on Magic Dam resulted in the dissolved oxygen levels in the Big Hole, in the Big Wood River, being below the required levels during July. Levels of 3 to 4 mg/l were observed compared to the required 5 mg/l.

Sampling in Mormon Reservoir during May did not find any trout, indicating that a complete loss of trout occurred during the previous fall and winter due to low water conditions. Gill-netting did sample yellow perch and bridgelip sucker. Even though catchables were released in May, fishing on the reservoir did not improve until fall.

Walleye fry and prespawning adult spottail shiner were introduced into Oakley Reservoir in 1989. Sampling in September found that young-of-the-year spottail shiner were present.

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OBJECTIVES

To maintain information for fishery management activities and decisions for lowland lakes and reservoirs.

METHODS

Kokanee Oncorhynchus nerka abundance and age structure were estimated in Anderson Ranch Reservoir during 1989 using a nighttime midwater trawl (Rieman et al. 1980, Bowles et al. 1986). Methodology for the trawling and data analysis was the same as used in 1986 and 1987 (Partridge 1988a). Kokanee trend counts were made weekly during the spawning run on the South Fork Boise River to compare with counts made on the trap.

General fishery data in lakes and reservoirs were collected with standard gear, including a Smith-Root Model SR-18 electrofishing boat with a Model 5.0 pulsator, variable mesh gill nets, trap nets, and 15.2 m, 6.2 mm square mesh beach seines. Methods and gear are described by Partridge et al. 1990.

RESULTS AND DISCUSSION

Anderson Ranch Reservoir

Kokanee Abundance

An estimated 629,000 kokanee were in Anderson Ranch Reservoir on July 31-August 1, 1989. The population estimate included 624,850 (99%) age 0+ and 4,217 (1%) age II+ fish (Table 1). Age I+ (1987 year class) kokanee were not sampled in 1989. The greatest density (608/ha) of age 0+ kokanee was found in the lower section of the reservoir near the dam, followed by the middle section of the reservoir (341/ha). The age 0+ year class is the largest sampled in the three years of sampling, being approximately three times as large as observed in 1986 and four times greater than 1987 (Table 2) (Partridge 1988a, Partridge 1988b).

Age 0+ kokanee ranged from 30 to 80 mm in length (predominately 50 to 60 mm), and age II+ kokanee ranged from 310 to 340 mm, similar to sizes observed in 1986 and 1987. Mean weight of the two groups was 1.5 g for age 0+ and 323 g for the age II+.

In addition to the kokanee sampled in the trawls, numerous age 0+ yellow perch Perca flavescens were collected. The yellow perch were found in a dense band throughout the reservoir in the upper 10 m of the water column. Similar bands of yellow perch fry were also observed in 1986 and 1987. Also, one of the 10,000 fall chinook salmon Oncorhynchus tshawytscha released on June 29, 1989 was sampled.

Table 1. Kokanee population estimates for Anderson Ranch Reservoir on July 31 to August 1, 1989. Ninety percent confidence limits are in parentheses.

Reservoir section	Age class			Total
	0+	1+	2+	
Lower	377,244	0	1,039	378,283
	(217,548)	-	(1,662)	(217,555)
Number/ha	608	0	2	610
Middle	198,170	0	2,678	200,848
	(260,181)	-	(2,473)	(260,193)
Number/ha	341	0	5	346
Upper	49,436	0	499	49,936
	(49,980)	-	(798)	(49,986)
Number/ha	138	0	1	139
Total	624,850	0	4,217	629,066
	(342,811)	-	(3,085)	(342,825)
Number/ha	400	0	3	403

Table 2. Estimated kokanee year class strength for Anderson Ranch Reservoir from 1986-1989.

Year Class	Population estimates			
	1986	1987	1988 ^a	1989
1983	8,686			
1984	11,147	5,883		
1985	220,184	131,701	- -	
1986		148,452	- -	4,217
1987			- -	0
1988				624,850
Total	240,017	286,036	- -	629,066

^aPopulation not estimated in 1988 due to low water levels.

Water temperatures in the upper 31 m of Anderson Ranch Reservoir on August 1, 1989, ranged from 10 to 24°C, and dissolved oxygen ranged from 4.1 to 9.0 mg/l (Figure 1).

Rokanee Spawning

The South Fork Boise River kokanee trap was operated from August 20 to October 6, 1989. A total of 8,131 kokanee were caught, consisting of 5,332 males and 2,779 females for a male:female ratio of 1.9:1. As in 1986, the majority of fish were caught between September 5 and 15, except for a surge of fish on September 18, 1989 following a rain storm (Figure 2). An additional 1,500 to 2,000 kokanee were observed spawning below the trap on September 21, 1989, and kokanee were also observed in Fall Creek below the road. Total run size in 1989 probably ranged from 10,000 to 12,000 kokanee.

In addition to the trap, spawning ground and holding area counts were conducted weekly above the trap from August 29 to October 4, 1989. The peak count for the 12 locations occurred on September 5, when 340 kokanee were observed (Table 3). Figure 2 shows a general count trend similar to the trap, but additional count and trap data will be needed in future years to see if selected sites can be used to estimate run size.

The mean size of female kokanee passing the trap was 334 mm, and the mean male length was 344 mm (Figure 3). Mean size was down from 1986 (female 380 mm, male 400 mm) and 1985 (female 342 mm, male 348 mm).

The trawl population estimate conducted on August 1, 1989 underestimated the fall spawning run size by more than half. One main reason for the under-estimate may be the time of the trawl sampling. By late July, mature kokanee may be staging in the shallower waters near the inlets and be less available in the main reservoir. In 1986 and 1987, trawling was conducted approximately one month earlier. The 1986 trawl estimate of mature kokanee was approximately the same as the estimated spawning run (Partridge 1988a). A second reason for the variation may be due to the unknown efficiency of the trawl at sampling larger kokanee.

The trawl data also shows a missing age class (brood year 1987) for the current reservoir kokanee population, which will result in poor fishing in 1990 and an insufficient spawning run. To compensate for the low spawning run, kokanee fingerlings from other sources will be needed in 1991.

Although kokanee population and spawning run data was not collected in 1988, the number of kokanee in the South Fork Boise River was greater than any year since 1985 and estimated to be about 30,000 fish. This spawning run resulted in the largest year class of age 0+ kokanee in the reservoir since population estimates have been started and should result in improved fishing in 1991.

Variation between the trawl data and trap data shows the need to conduct both sampling methods until a better correlation can be achieved. With a good model of the kokanee population dynamics in the reservoir, population size can be controlled by limiting spawning escapement or supplementing recruitment, resulting in the modification of the high and low cycles in the population.

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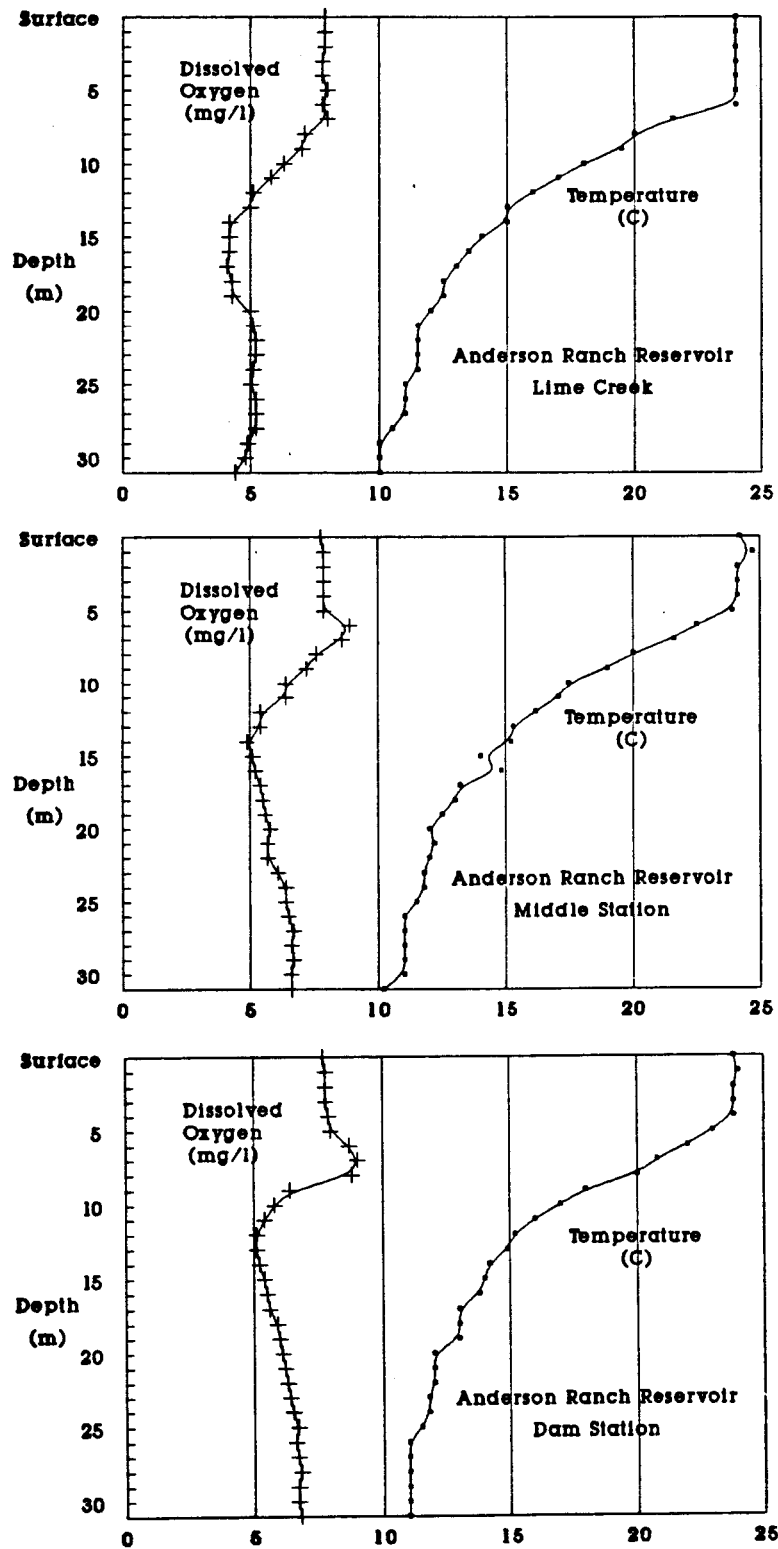


Figure 1. Temperature and dissolved oxygen profiles in Anderson Ranch Reservoir, August 1, 1989.

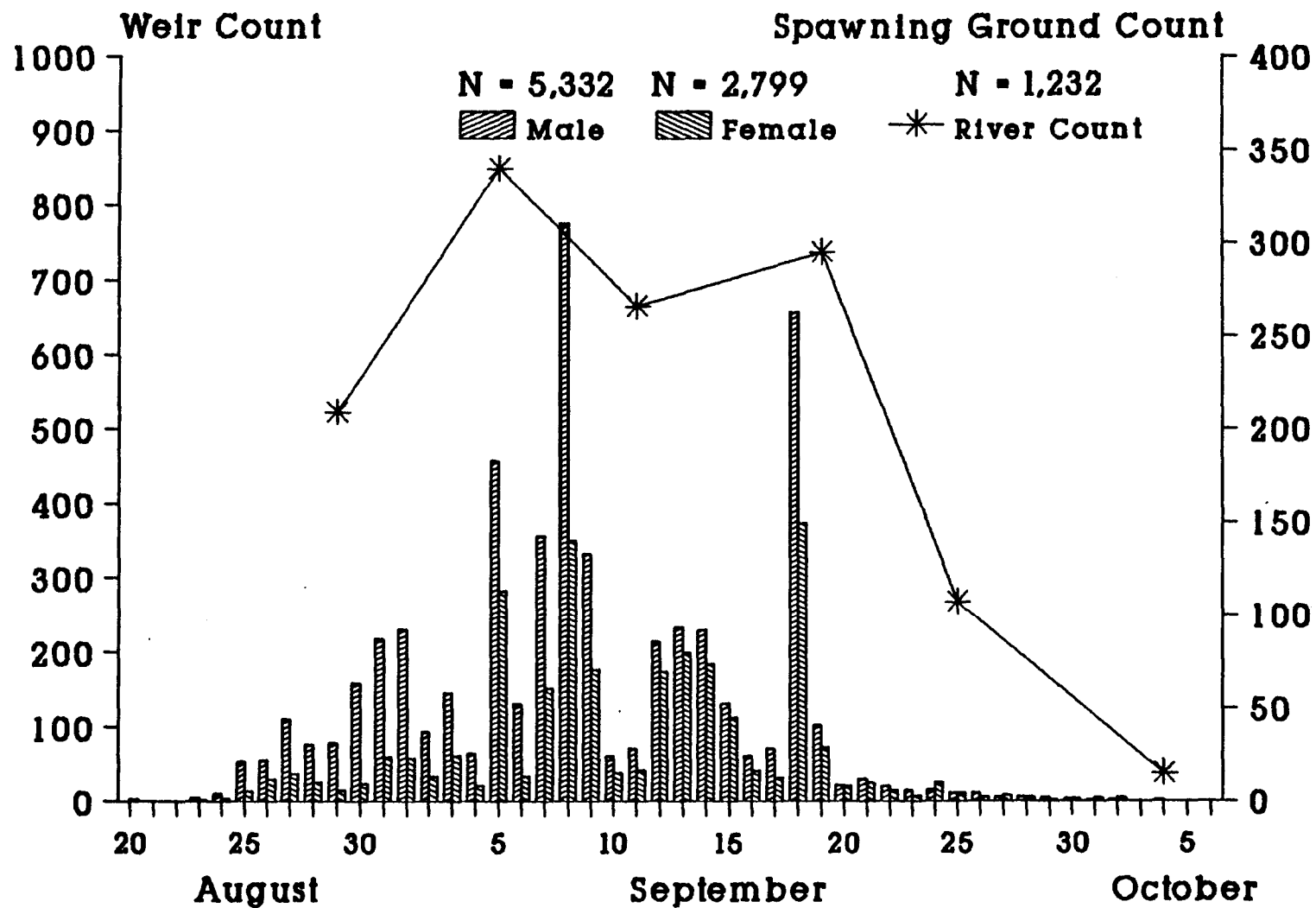


Figure 2. Number of kokanee counted past the South Fork Boise River weir and numbers observed in selected observation areas on the river in 1989.

Table 3. Number of kokanee observed in selected sites on the South Fork Boise River, 1989 during spawning ground surveys.

Location ^a	Aug 29	Sep 5	Sep 11	Sep 19	Sep 25	Oct 4
1	20	22	62	83	18	6
2	150	83	22	37	15	4
3	35	33	44	38	7	1
4	NC	0	32	49	20	3
5	4	78	42	72	38	0
6	0	27	19	12	2	1
7	0	18	2	0	4	0
8	0	9	12	0	0	0
9	0	68	31	4	1	0
10	0	2	0	0	2	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
Total	209	340	266	295	107	15

^aSite Descriptions:

- 1- Prospect Hole - NW1/4, NE1/4, Sec18, T2N, R10E
- 2- Johnson Hole - SW1/4, NE1/4, Sec5, T2N, R10E
- 3- Paradise Hole - SW1/4, NW1/4, Sec33, T3N, R10E
- 4- Trinity Creek - SE1/4, SW1/4, Sec9, T3N, R10E
- 5- Section 10 Hole - SE1/4, NE1/4, Sec10, T3N, R10E
- 6- Chaparral Hole - NE1/4, NE1/4, Sec10, T3N, R10E
- 7- Ranger Station Hole - NE1/4, NE1/4, Sec8, T3N, R11E
- 8- Virginia Gulch Bridge - SE1/4, SE1/4, Sec9, T3N, R11E
- 9- Baumgartner Hole - SE1/4, SE1/4, Sec7, T3N, R12E
- 10- Deadwood Hole - NE1/4, NE1/4, Sec22, T3N, R12E
- 11- Big Hole - SE1/4, SW1/4, Sec18, T3N, R13E
- 12- Smokey Creek Hole - SE1/4, SW1/4, Sec9, T3N, R13E

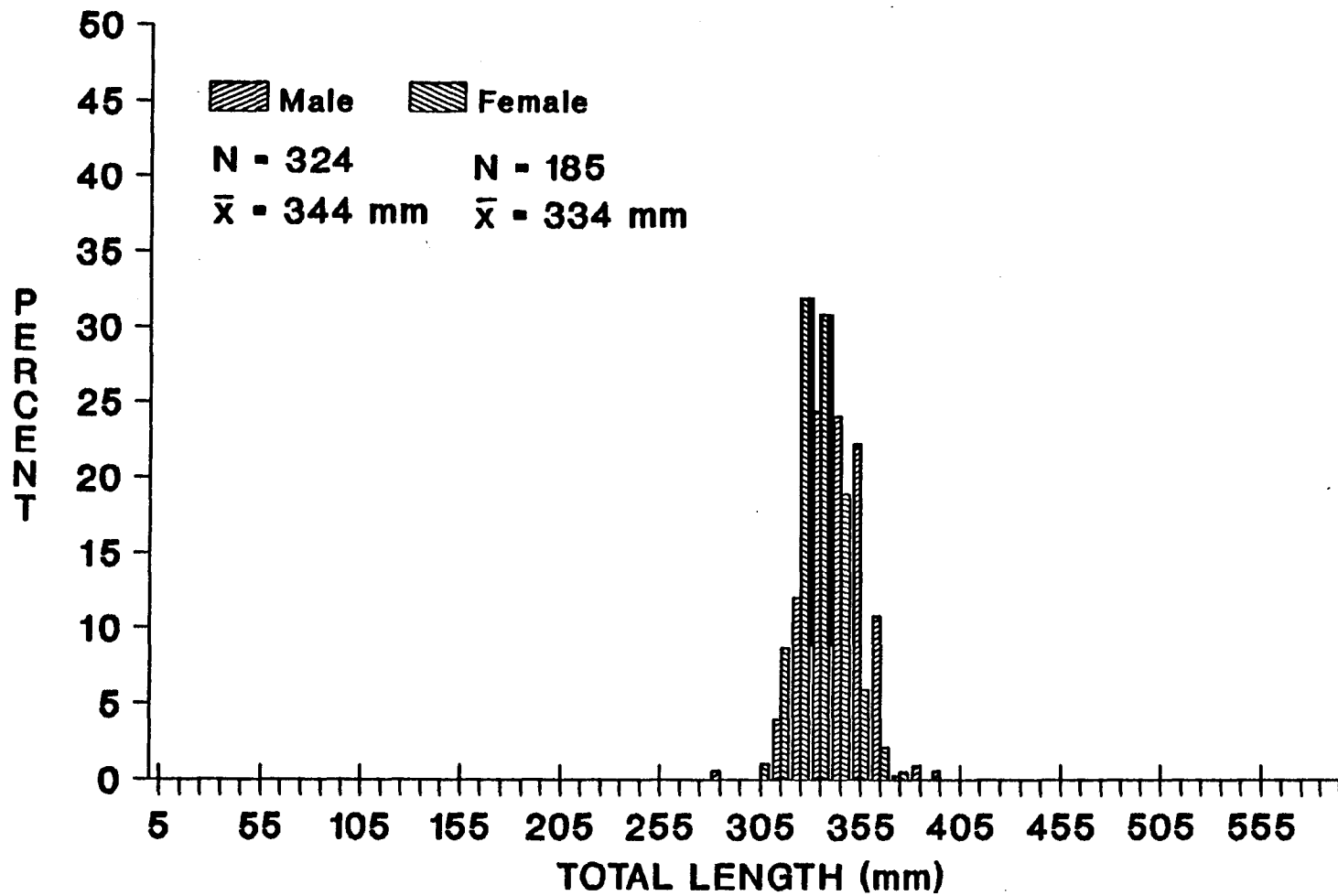


Figure 3. Length frequency of kokanee sampled at the South Fork Boise River weir.

Bray Lake

Bray Lake is a small irrigation impoundment (82 ha when full) located approximately 16 km northeast of Bliss, Gooding County, Idaho. It receives runoff water via an 8-km canal from Dry Creek to the northeast. The shallow bowl-shaped reservoir is devoid of vegetation and structure. Historically, a few native rainbow trout Oncorhynchus mykiss have drifted down the canal in high water years and have shown good growth in the reservoir, and channel catfish Ictalurus punctatus were introduced in the 1970s to bolster a poor yellow perch and trout fishery.

Water quality and reservoir depth was sampled on Bray Lake on August 22, 1989. Maximum depth was found to be 3 m. Water temperature was 19.8°C throughout the water column at two 2.5-m deep sites in the reservoir, except for a surface reading of 20.0°C at Site 1 (upper 1/3 of reservoir). Dissolved oxygen levels were 6.8 mg/l throughout the water column at both sites, except for readings of 6.6 mg/l on the surface and at the bottom of Site 2 (front of dam).

Fish populations in Bray Lake were sampled on June 29 and August 21, 1989 with beach seines and overnight trap and gill nets. A total of ten channel catfish, one blue catfish Ictalurus furcatus, six bridgelip sucker Catostomus columbianus, and five redband shiner Richardsonius balteatus were sampled (Table 4). Channel catfish ranged in size from 255 to 350 mm, with the largest weighing 370 g. Mean size was 290 mm compared to 199 mm in 1985 (Olsen and Bell) and 240 mm in 1986 (Grunder et al. 1987). The blue catfish was 245 mm and 55 g. If the catfish are from plants in the reservoir, growth has been slow. Channel catfish were stocked in 1983 (51,684 at 9,475/kg) and blue catfish in 1985 (3,978 at 57/kg).

Temperatures in Bray Lake during August did not seem to be excessive for a warm temperature-tolerant trout, such as redband or Lahontan cutthroat trout Oncorhynchus clarki henshawi. Reports of occasional nice trout indicate that the native Dry Creek redband trout have survived in the reservoir. It is possible that additional trout from Dry Creek could be moved into the reservoir to bolster the trout fishery. Additional work on structure projects in the reservoir could improve cover for forage species such as redband shiner.

Cow Creek Reservoir

Cow Creek Reservoir is being considered for purchase by the Idaho Department of Fish and Game (IDFG) to provide an additional trout fishery. It is located approximately 24 km due west of Fairfield, Idaho in Elmore County. Historically, it has produced rainbow trout in the 1.8 to 4.6 kg range, but has not been stocked for nearly 26 years due to loss of access. Currently, the reservoir contains bridgelip sucker (Grunder et al. 1989).

Temperature and dissolved oxygen levels were sampled in Cow Creek Reservoir on August 21, 1989 to see if summer conditions were acceptable for trout. Due to the relative shallow (4.5 m, 10 m when full) nature of the reservoir and

Table 4. Fish population data from Bray Lake, June 29, 1989.

Gear number	Channel catfish				Blue catfish				Bridgelip sucker				Bedside shiner			
	Total length (mm)				Total length (mm)				Total length (mm)				Total length (mm)			
	No	Min	Max	Mean	No	Min	Max	Mean	No	Min	Max	Mean	No	Min	Max	Mean
Beach seine 6	1	350	350	350	0	-	-	-	0	-	-	-	0	-	-	-
Trap net 2	0				0	-	-	-	5	142	165	157	5	66	91	82
Gill net 1	4	260	345	288	1	245	245	245	0	-	-	-	0	-	-	-
Gill net ^a 1	5	255	321	279	0	-	-	-	1	180	180	180	0	-	-	-
Total	10	255	350	290	1	245	245	245	6	142	180	161	5	66	91	82

^aAugust 21, 1989

prevailing winds in the area, temperature and dissolved oxygen levels were relatively uniform throughout the reservoir. Water temperature was predominantly 18.5°C, and dissolved oxygen ranged from 4.2 on the bottom to 7.0 in the upper meter near the dam (Table 5, Figure 4).

Emerald Lake

On July 28, 1989, temperature and dissolved oxygen readings were taken in Emerald Lake at two sites, and two gill nets were set for three hours. Results of the water quality profile are:

<u>Depth</u>	<u>Temperature (C)</u>		<u>Dissolved Oxygen (mg/l)</u>	
(m)	<u>Site 1</u>	<u>Site 2</u>	<u>Site 1</u>	<u>Site 2</u>
Surface	28.0	27.5	10.1	10.2
1	23.5	23.5	8.3	10.2
2	22.5	22.5	4.5	5.0
2.5	--	22.0	--	3.6

The two gill nets caught 43 largescale sucker Catostomus macrocheilus, 4 hatchery rainbow trout, and 3 yellow perch. Lengths for the largescale sucker ranged from 140 to 565 mm, with 705 of the fish being larger than 400 mm. Mean length of the largescale sucker was 404 mm; rainbow trout, 274 mm; and yellow perch, 160 mm.

Magic Reservoir

The construction of a hydropower facility on Magic Dam in 1989 changed the nature of the water discharge outlet into the Big Wood River. This change eliminated the aeration of water leaving the reservoir by placing the outlet below the water line in the discharge pool. Although the license of the hydro project requires a minimum of 5 mg/l of dissolved oxygen in the discharge water through July, the facility was not able to meet this requirement during their first year of operation without bypassing the generators and discharging through the old outlet ports.

In mid-July, Mike McMasters (Idaho Division of Environmental Quality, personal communication) reported dissolved oxygen levels near 3 mg/l in the Big Hole below Magic Dam. On July 25, 1989, dissolved oxygen levels were 3.9 mg/l (temperature 16°C) at the power plant discharge. On the same day, a dissolved oxygen profile in the reservoir in front of the dam showed levels of 3.4 to 3.6 mg/l at the elevation of the intake structure (Figure 5). By August 26, 1989, the reservoir level had been drawn down to the point that the reservoir was no longer stratified above the outlet structure.

During the last week of irrigation discharge, the water was released through the gates instead of the powerhouse. The gates were closed on September 3, 1989.

Table 5. Temperature and dissolved oxygen profiles from Cow Creek Reservoir on August 21, 1989.

Depth (m)	Temperature (C)	Dissolved oxygen	Temperature (C)	Dissolved oxygen
	Station 1		Station 2	
Surface	18.5	6.0	18.5	6.0
0.5	18.5	6.0	18.5	5.6
1.0	18.5	5.2	18.5	5.6
1.5	--	--	18.5	5.6
2.0	--	--	18.5	5.6
2.5	--	--	17.0	4.2
	Station 3		Station 4	
Surface	18.5	6.0	18.5	7.0
0.5	18.5	6.2	18.5	7.0
1.0	18.5	6.2	18.5	7.0
1.5	18.5	6.2	18.5	6.8
2.0	18.5	6.2	18.5	6.8
2.5	18.5	6.2	18.5	6.8
3.0	18.5	6.2	18.5	6.8
3.5	17.0	4.2	18.5	6.8
4.0	--	--	17.5	5.2
4.5	--	--	17.0	4.6

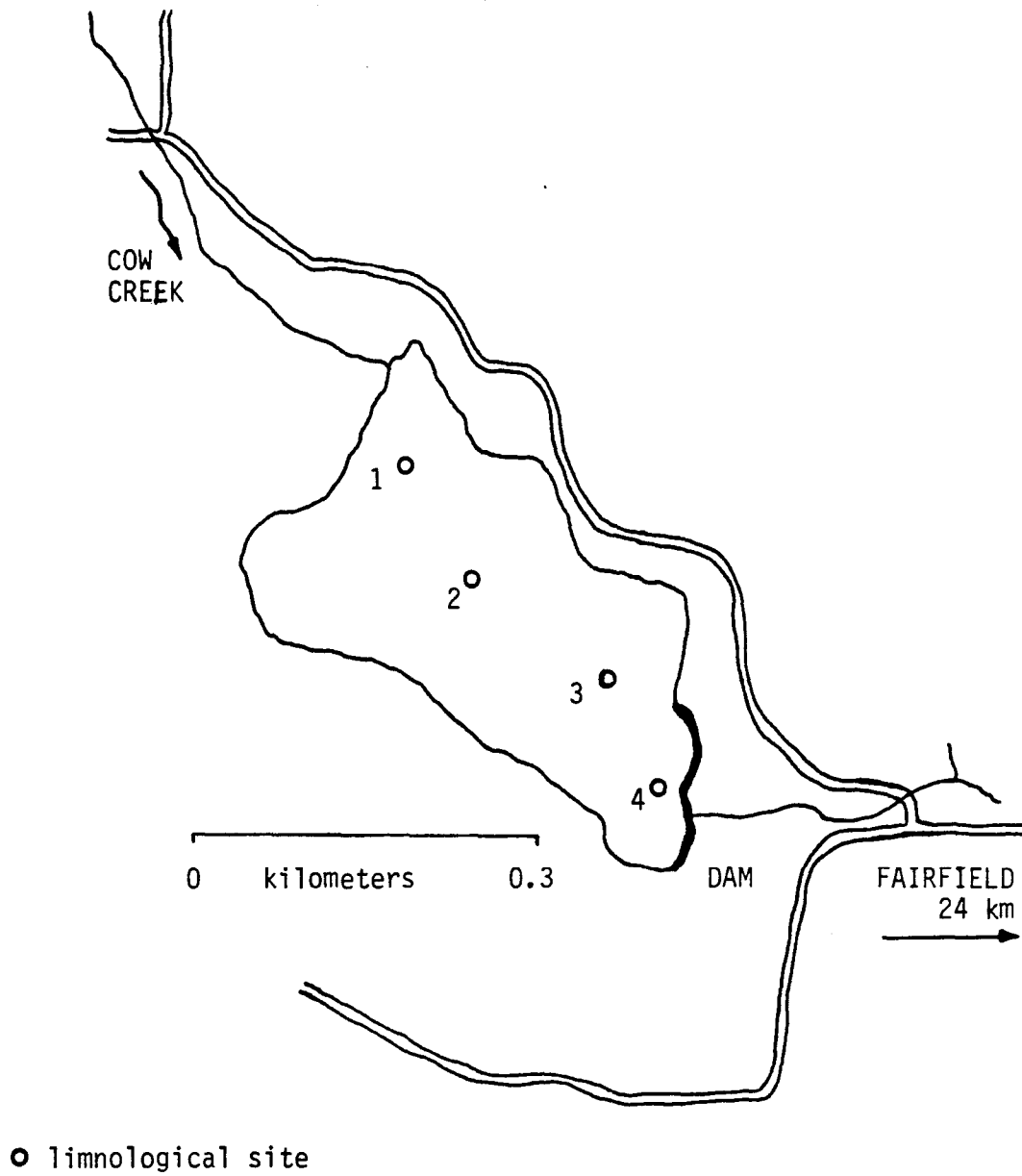


Figure 4. Location of limnological sites in Cow Creek Reservoir, August 21, 1989.

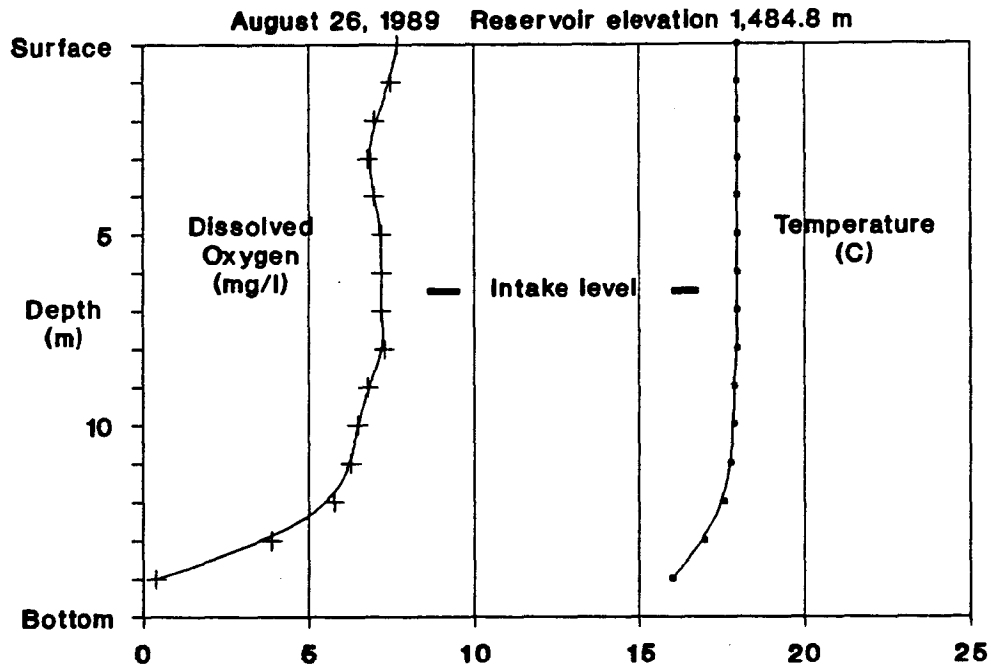
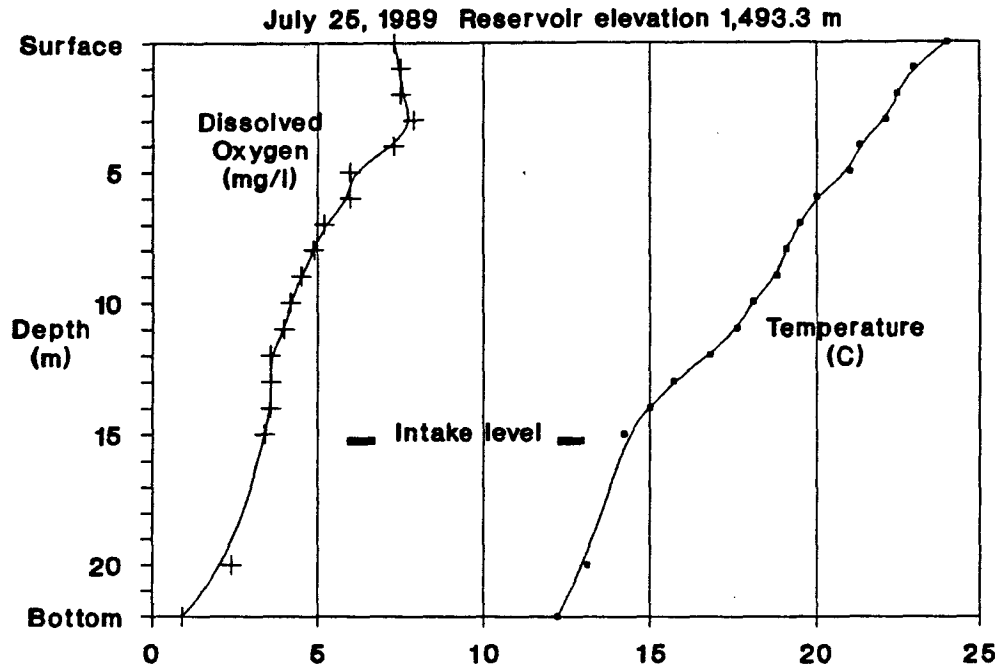


Figure 5. Temperature and dissolved oxygen profiles in Magic Reservoir in front of the intake for the powerhouse.

In the evening, dissolved oxygen levels in the Big Hole below the dam were 10.4 mg/l (temperature 18.2°C) on the surface and 9.2 mg/l at two meters. The following morning, levels were 9.2 at the surface and 9.0 mg/l at two meters (temperature 16°C).

Mormon Reservoir

As a result of extremely low precipitation in 1987 and 1988, winter water storage in Mormon Reservoir was at its lowest level since it was treated in 1961. Observation of reservoir water level in October 1988 found that the upper end of the reservoir was in the Narrows below the Dairy Creek arm, leaving the spring areas devoid of water.

Three overnight gill nets were set in Mormon Reservoir on May 11, 1989 to determine overwinter survival of fish. A total of 49 yellow perch and 42 bridgelip sucker were caught (Table 6). The majority (79%) of fish were caught in the first net nearest the dam, with only three bridgelip sucker being sampled in the net placed in the spring area. Yellow perch had a mean length of 252 mm and bridgelip sucker, 313 mm (Figure 6).

In addition to the lack of trout in the gill net samples, anglers reported that they were not catching any trout in the reservoir during the spring of 1989. Normally, the spring fishery is excellent for rainbow trout and has the best catch rates of the season (Partridge 1988). Although Bell (1970) reported partial winter kills on trout in the past, it appears that a total loss of trout occurred in the reservoir in 1988-89. Even after the release of catchable rainbow trout in May and June, fishing remained poor throughout the summer. The reservoir level remained low, near shore aquatic vegetation densities were severely reduced, and normally clear water was quite turbid due to wave action on the exposed shorelines and shallow water. Due to the poor fishing, the local officer reported that almost no fishing occurred on the reservoir until fall, when conditions and fishing began to improve. Returns from jaw-tagged fish released in June did not occur until mid-August and were considerably lower than would be expected in normal years (see Catchable Trout Evaluations, this report).

Oakley Reservoir

On April 21, 1989, walleye Stizostedion vitreum were introduced into Oakley Reservoir to provide an additional game species. A total of 1,000,000 fry were released. On June 5, 1989, 50,000 prespawning adult spottail shiner Notropis hudsonius from a Minnesota bait dealer were also released in Oakley Reservoir to provide an additional forage base for introduced walleye. Inspection of spottail shiner at time of release found that the load also contained a small number of common shiner N. cornutus and bluntnose minnow N. simus. A sample of 503 spottail shiner showed a sex ratio of 83% male and 17% female. Mean total length of males was 89 mm and females, 93 mm.

On September 6, 1989, shoreline beach seine samples were taken in Oakley Reservoir to document spottail spawning. Six sites along the western shore between the dam and Trapper Creek were netted. A total of 147 fish were sampled

Table 6. Number of fish sampled in overnight gill net sets in Mormon Reservoir, May 11-12, 1989.

Net	Hours Fished	Yellow Perch	Bridgelip Sucker	Total
1 ^a	15.5	48	24	72
2 ^b	15.5	1	15	16
3 ^c	15.5	0	3	3
Total		49	42	91

^aNarrows, east side, SE1/4, SW1/4, Sec4.

^bDairy Creek Point, NW1/4, SW1/4, Sec8.

^cSprings, SW1/4, SE1/4, Sec7.

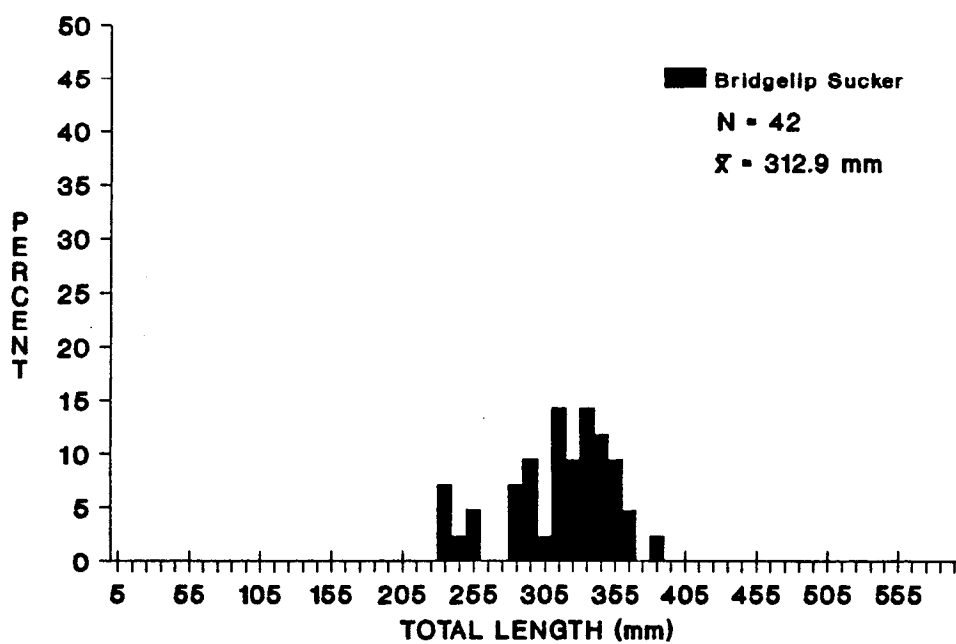
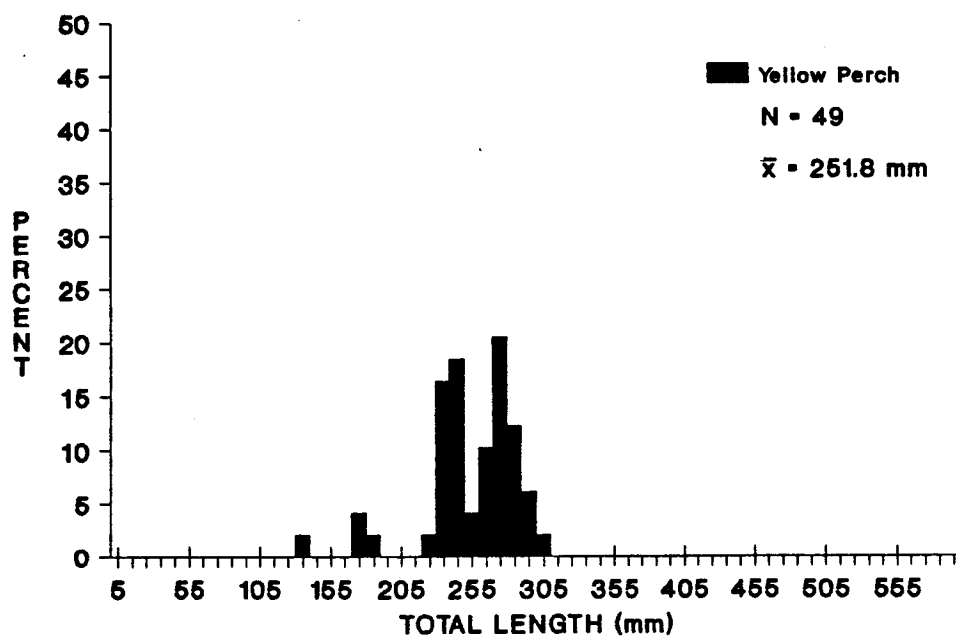


Figure 6. Length frequency of yellow perch and bridgellip sucker sampled in gill nets from Mormon Reservoir, May 12, 1989.

consisting of sucker sp. (38.1%), spottail shiner (26.5%), redbside shiner (21.8%), sculpin sp. Cottus P. (13.6%), dace sp. Rhinichthys sp. (0.7%), and yellow perch (0.7%). All but two of the spottail shiner were young-of-the-year (YOY), ranging in length from 22 to 42 mm (mean 32.0 mm). Mean lenes of species were: sucker 52.0 mm, redbside shiner 77.6 mm, sculpin 37.5 mm, dace 69 mm, and yellow perch 152 mm.

Walker (Dog Creek) Reservoir

Walker Reservoir is a 30 ha reservoir located in Sec 6, T52, R11E approximately 2 km northeast of King Hill, Idaho. It is an off-stream impoundment which receives water from King Hill Creek by canal and from the Snake River by pumping. It lies partially on Bureau of Land Management (BLM) land and partially on private land. In 1989, the BLM proposed installing fish habitat structures in the reservoir to improve fishing. Fish population data and reservoir depths were collected on July 6-7, 1989, prior to finalizing the habitat project.

Fish populations were sampled with **six** beach seine hauls, and overnight sets of three trap nets and two gill nets. The only game species sampled were brown bullhead Ictalurus nebulosus, with bridgelip and largescale sucker and chiselmouth Acrocheilus alutaceus comprising the nongame species. A total of 109 brown bullhead, 43 suckers, and 1 chiselmouth were collected (Table 7). Brown bullhead ranged in size from 165 to 220 mm, with a mean length of 193 mm and with the largest weighing 210 g (Figure 7).

Although reservoir depths had been reported to be greater than 6 m in front of the dam, the deepest area measured was only 2 m on July 7, 1989. Due to the shallow nature of the reservoir, and to possible modifications to the outlet structure on the dam by the landowner, the habitat project has been postponed.

Catchable Trout Evaluations

1989 Tag Releases

Mormon Reservoir-In 1989, 1,700 of the 40,152 catchable rainbow trout (Hayspur) released in Mormon Reservoir were jaw-tagged. The tagged fish were released on June 15 and consisted of 200 reward and 1,500 regular tags. Tagged fish averaged 197 mm in length and 82 g when released. Anglers returned 36 regular and 7 reward tags during the June 15, 1989 to February 28, 1990 interval. A noncompliance rate of 31.4% was calculated, which resulted in an estimated catch of 63 fish, or 3.7% of the release.

Due to record low water levels in 1988, fishing conditions in Mormon Reservoir were not normal in 1989 (see Mormon Reservoir, this report). Although the fish were released in June, the first reported catch of tagged fish did not occur until August 10, 1989. The majority of tagged fish were caught in September (37%) and October (53%). Growth of tagged fish was still good, with angler-reported sizes ranging from 235 to 380 mm (mean 301 mm) and weights up to 1,100 g in December.

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Table 7. Fish population data from Walker (Dog Creek) Reservoir, July 7, 1989

Gear number	Brown bullhead				Sucker sp ^a				Chiselmouth	
	Total length (mm)				Total length (mm)				Total length (mm)	
	No	Min	Max	Mean	No	Min	Max	Mean	No	Total length (mm)
Beach seine 6	1	198	198	198	23	23	50	33	0	-
Trap net 3	14	184	205	197	4	97	195	134	0	-
Gill net 2	94	165	220	192	16	155	473	327	1	290
Total	109	165	220	193	43	23	473	152	1	290

^aBridgelip and largescale, combined.

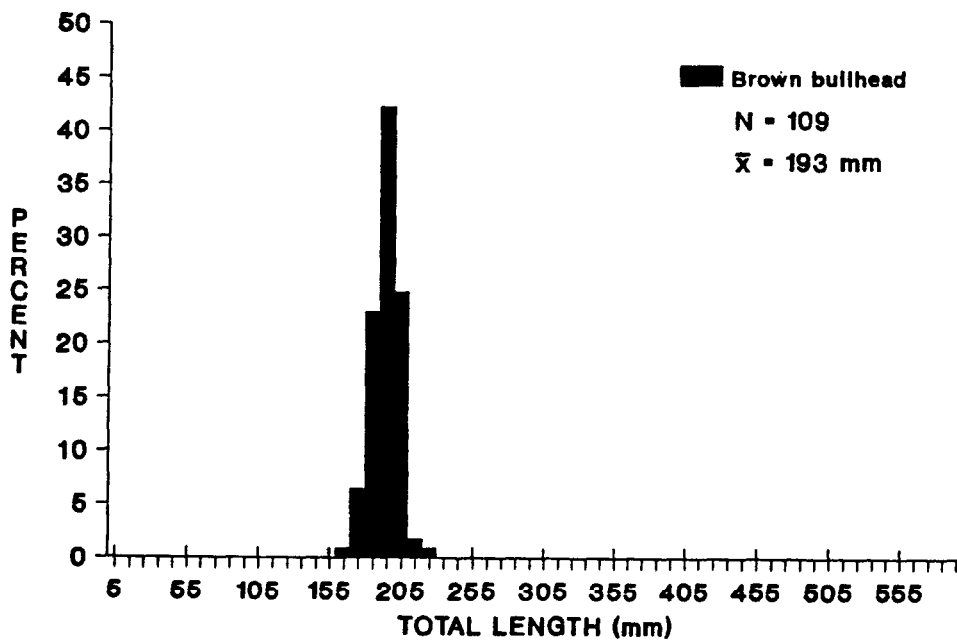
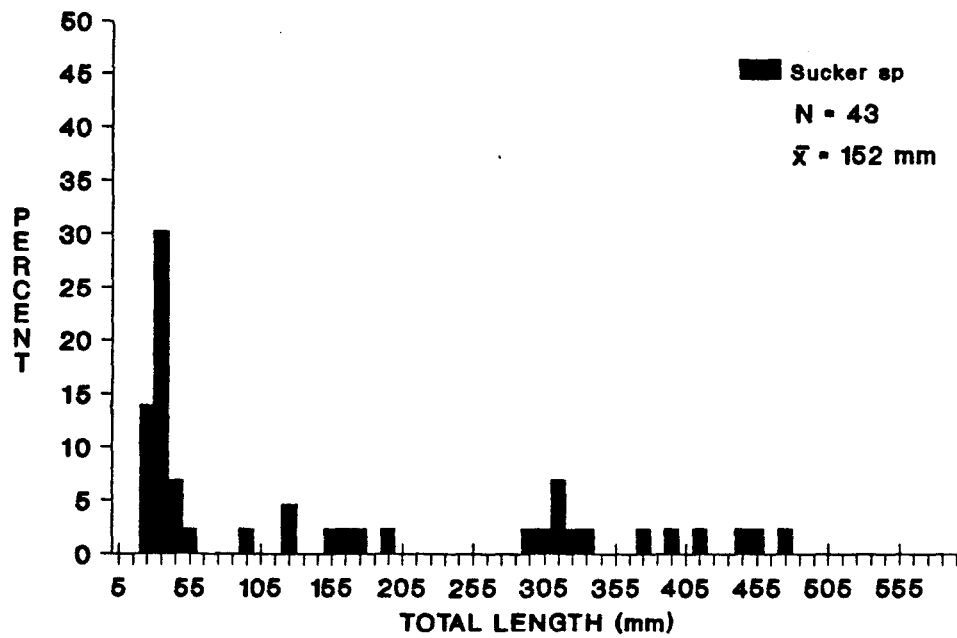


Figure 7. Length frequency of brown bullhead and sucker sp. from Walker Reservoir, July 7, 1989.

1988 Tag Releases

Lake Walcott-On June 20, 1988, 2,200 jaw-tagged catchable rainbow trout (Mt. Lassen) were released in Lake Walcott near the dam (Partridge et al. 1990). During March 1, 1989 to February 28, 1990, anglers returned 28 regular and 5 reward tags bringing the total returns to 62 and 17, respectively. Based on total returns, harvest of tagged fish was estimated to be 217 or 9.8%. While 46% of the fish harvested in the first season had moved down through the dam to the river, only 24% of the fish harvested in the second season were caught in the river. Sixty-four percent of the 1989 returns were caught in the reservoir near the dam and the rest were caught near Smith Springs in the upper end of the reservoir. Growth of the fish is excellent, with several fish reported being in excess of 500 mm and 2,300 g.

South Fork Boise River-On June 13, 1988, 1,100 jaw-tagged fish were released in the South Fork Boise River. Only one additional reward tag was returned in the 1989 season, bringing the total tag returns to 137 regular and 22 reward tags. Estimated harvest of tagged fish was 255 (23.2%). The fish caught in 1989 was taken near Anderson Ranch Dam on May 27 and was 405 mm in length.

Emerald Lake-No additional tags were returned from the 1988 release of tagged fish in Emerald Lake.

1987 Tag Releases

Lower Salmon Falls Reservoir-Three additional tags were returned from 5,250 tagged rainbow trout released in June, 1987 in Lower Salmon Falls Reservoir. Two of the fish were caught in June and July, 1989, in the Dolman Rapid area at the upper end of the reservoir. The third fish had been caught in the Glenns Ferry area of the Snake River in 1987. Estimated harvest remained at 1,257 fish (24%) (Partridge et al. 1990).

Snake River at Glenns Ferry-Ten additional tags were returned from 2,100 tagged rainbow trout released in July, 1987 in the Snake River at Glenns Ferry. All the fish had been caught near the release site in August and September, 1987. A total of 56 regular and 1 reward tag have been returned. Due to the low percentage of reward tags returned (1%), compliance cannot be estimated. Based on the 2.7% of tags returned and compliance estimates from other waters, estimated harvest would range from 5 to 10%.

Regional Creel Surveys

Information was collected on eight regional waters on the general fishing opener (May 27, 1989) and on the Hagerman WMA on its July 1, 1989 opener. Catch rates ranged from 0 fish/h on Little Camas Reservoir to 2 fish/h on Magic Reservoir (Table 8). Data from miscellaneous creel checks on 27 regional waters

Table 8. Results of creel checks performed at Region 4 water on opening day (May 27) of the general fishing season, 1989.

Location	Anglers	Hours fished	Fish Caught								Fish per hour
			Rainbow trout	Brown trout	Cutthroat trout	Brook trout	Coho salmon	Largemouth bass	Bluegill	Yellow Perch	
Billingsley Creek	10	36	41	2	0	0	0	0	0	0	1.2
Goose Creek	52	106	67	1	0	2	0	0	0	0	0.7
Hagerman WMA ^a	125	398	116	0	0	0	0	28	153	2	0.8
Little Wood Res.	49	130	33	0	1	0	0	0	0	0	0.3
Little Camas Res.	11	12	0	0	0	0	0	0	0	0	0.0
Magic Reservoir	21	14	28	0	0	0	0	0	0	0	2.0
Silver Creek	27	64	29	2	0	0	0	0	0	0	0.5
Stone Reservoir	6	8	1	0	0	0	0	0	0	0	0.1
Sublett Reservoir	151	349	30	37	0	0	32	0	0	0	0.3

^aOpening day, July 1, 1989.

is presented in Table 9. Species observed in the anglers creel included rainbow trout, brown trout Salmo trutta, kokanee, fall chinook salmon, coho salmon Oncorhynchus kisutch, bull trout Salvelinus confluentus, brook trout S. fontinalis, mountain whitefish Prosopium williamsoni, smallmouth bass Micropterus dolomieu, largemouth bass M. salmoides, walleye, yellow perch, bluegill Lepomis macrochirus, channel catfish, and brown bullhead.

RECOMMENDATIONS

- 1) Monitor kokanee and fall chinook populations annually in Anderson Ranch Reservoir until sufficient information is obtained to develop a reservoir model and reduced monitoring techniques.
- 2) Supplement the 1990 brood year class of kokanee in Anderson Ranch Reservoir with hatchery releases (spring of 1991).
- 3) Stock native redband rainbow trout from Dry Creek in Bray Lake.
- 4) Develop fishery habitat projects on Bray Lake.
- 5) Monitor and compare water temperatures and dissolved oxygen levels in Magic Reservoir and the Big Hole Big Wood River.

Table 9. Summary of miscellaneous spot creel checks performed at Region 4 waters during 1989, excluding opening day (May 27).

Location	Date	Ang.	Hours fished	Catch Rate (fish/h) per species							
				Rainbow trout Hatchery	Wild ^a	Brown trout	Kokanee	Bass	Yellow perch	Bluegill	Other
Anderson Ranch Reservoir	Apr	32	89	0.36	0.18	0	0	0	0	0	0.01 ^b
	May	35	94	0.03	0.03	0	0.07	0.02	0.01	0	0.01 ^c
	Jun	3	25	0	0	0	0.92	0.04	0	0	0.04 ^b
	Jul	105	412	0.01	0	0	0.42	<0.01	0.05	0	<0.01 ^d
Blair Trail Reservoir	Jul	3	6	0	0	0	0	0	0	2.83	0
Bruneau Dune Pond 11	Apr	1	3	0	0	0	0	0	0	6.67	0
Cleveland Lake	Jul	14	34	0.82	0	0	0	0	0	0	0
Dog Creek Reservoir	Jun	11	25	0.32	0	0	0	0	0.16	0.48	0
Fish Creek Reservoir	Sep	12	13	2.46	0	0	0	0	0	0	0
Goose Creek	May	14	16	1.21	0	0	0	0	0	0	0.06 ^e
Hagerman WMA	Jun	70	105	0.24	0	0	0	0	0	0.13	0
Little Wood Reservoir	Jun	18	46	0.30	0	0	0	0	0	0	0
Little Camas Reservoir	Jul	03	17	0.24	0	0	0	0	0	0	0
Magic Reservoir	May	22	26	0.94	0.08	0	0	0	0	0	0
	Jun	52	130	0.32	0.01	0	0	0	0.02	0	0
	Jul	70	205	0.43	0	0	0	0	0.16	0	0
	Aug	88	224	0.68	0	0	0	0	0	0	0
	Sep	6	18	0.72	0	0	0	0	0	0	0
Mormon Reservoir	Sep	10	20	0.55	0	0	0	0	0	0	0
Oakley Reservoir	Jul	4	14	1.14	0	0	0	0	0	0	0

Table 9. Continued.

Location	Date	Ang.	Hours fished	Rainbow trout		Brown trout	Catch Rate (fish/h) per				
				Hatchery	Wild ^a		Kokanee	Bass	Yellow perch	Bluegill	Other
Rock Creek	Jul	7	6	1.27	0.36	0	0	0	0	0	0
Roseworth Reservoir	Sep	18	26	0.77	0	0	0	0	0	0	0
Salmon Falls Creek Reservoir	Jan	16	66	0.65	0	0	0	0	0	0	0.03 ^d
	Apr	18	49	0.51	0	0	0	0	0	0	0
	Jun	16	83	0.04	0	0	0	0	0	0	0.05 ^f
	Jul	45	199	0.03	0	0	0	<0.01	<0.01	0	0.06 ^f
	Aug	28	72	0.08	0	0	0	0.01	0	0	0.01 ^f
	Sep	22	80	0.16	0	0	0	0	0	0	0
Snake River											
Burley	Jun/Jul	11	25	0	0	0	0	0.36	0.04	0	0.36 ^g
Glenns Ferry	Jul	3	9	0	0	0	0	0	0	0	0
Minidoka	Jul	25	59	0.07	0	0	0	0	0	0	0
Salmon Falls, L.	Mar	34	176	0.22	0	0.01	0	0.08	0	0	0
Salmon Falls, U.	Mar	6	24	0.50	0	0	0	0	0	0	0
Stone Reservoir	Jun	18	52	0.58	0	0	0	0	0	0	0
Sublet Reservoir	Jun	40	90	0.12	0.03	0.1	0	0	0	0	0.09 ^h
Thorn Creek Reservoir	Jun	24	22	0.51	0	0	0	0	0	0	0
Walcott Reservoir	Jun	12	17	0	0	0	0	0	0	0	0
	Jul	31	51	0.02	0	0	0	0	0	0	0
Wilson Lake	Jul	2	6	0	0	0	0	0	0	0	1.00 ⁱ

^aIncludes hatchery fingerling rainbow trout with good fins.

^bBull trout.

^cMountain whitefish.

^dFall chinook salmon.

^eBrook trout.

^fWalleye.

^gChannel catfish.

^hCoho salmon.

ⁱBrown bullhead.

ACKNOWLEDGMENTS

Data on kokanee populations in Anderson Ranch Reservoir and kokanee trapping were collected by Bruce Rieman and other fisheries research personnel. Fisheries technicians Mike Casten and Bryan Fuell collected field data and assisted with data summarization and analysis. Conservation officers and regional and research staff collected and assisted with creel data.

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JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management
Investigations

Project No: F-71-R-14

Job No.: 4-c

Title: Region 4 Rivers and Streams
Investigations

Period Covered: July 1, 1989 to June 30, 1990

ABSTRACT

Fish populations were sampled by electrofishing in 13 streams and drainages in Region 4 during 1989 to acquire information for comments on stream projects, annual monitoring, brown trout strain evaluations, and genetic diversity studies.

Brown trout redd counts on the Big Wood River showed a sharp decline in 1989 from numbers observed in 1986-1988. A total of 61 redds were observed, compared to a previous low of 122 in 1986 and a high of 196 in 1987. Brown trout strain evaluations in the Little Wood River showed that hatchery brown trout fingerlings released in 1987 were contributing a significant portion of the population. The number of fish sampled from the three strains released in 1988 was insufficient to determine differences between strains, although they did account for 10% of the year class.

Based on external characteristics, wild rainbow trout in the Grouse Creek drainage of the South Fork Boise River appear to be a native redband trout. The fish were found in limited numbers in four of the five stream sections sampled in the upper Grouse Creek drainage, with densities ranging from 3.3 to 45.9/100 m of stream in the four areas.

Twenty-two adult white sturgeon were inspected for sexual maturity for the white sturgeon broodstock program. One female was placed in the CSI hatchery for spawning in 1990 along with two males.

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OBJECTIVES

To maintain information for fishery management activities and decisions for rivers and streams.

METHODS

Stream surveys on regional waters used techniques reported by Grunder et al. (1987). Fish populations were sampled with electrofishing gear depending on stream and river size. Gear included a Smith-Root Model 15-A backpack shocker, Georator bank-operated shocker, Smith-Root Model SR-18 electrofishing boat with a 5,000-watt generator and a Model 5.0 pulsator, and an aluminum drift boat with a 3,000-watt generator with a variable voltage pulsator.

RESULTS AND DISCUSSION

Bennett Hills Native Trout

Samples from fish populations in three streams were collected with a backpack electrofisher to determine whether the trout populations were native populations without hatchery influence or not and to determine species classification. All three streams lie on the south slope of the Bennett Hills. An additional sample was collected from Vinyard Creek above Twin Falls on the Snake River. Samples taken will have mitochondrial DNA patterns analyzed (Williams and Shiozawa 1989).

Clover Creek

On October 16, 1989, 20 wild rainbow trout Oncorhynchus mykiss were collected from approximately 600 m of Clover Creek (NW1/4, Sec11, T4S, R13E). The stream section is accessible on a four-wheel-drive road. In addition to the rainbow trout collected, about six young-of-the-year (YOY) trout were observed, along with numerous sucker sp. Catostomus sp., dace sp. Rhinichthys sp., and reidside shiner Richardsonius balteatus. The rainbow trout collected ranged from 150 to 330 mm, with a mean length of 249 mm (Figure 1). Condition (K) ranged from 0.89 to 1.21, with a mean of 1.06.

Dry Creek

On July 12, 1989, 30 wild rainbow trout were collected from approximately 200 m of Dry Creek (SE1/4, SE1/4, Sec6, T4S, R11E). The stream section lies above the diversion canal for Bray Lake and is accessible by road. The surrounding vegetation is predominately sagebrush, except for dense willows along the stream. Samples were collected by backpack shocker. In addition to the fish collected,

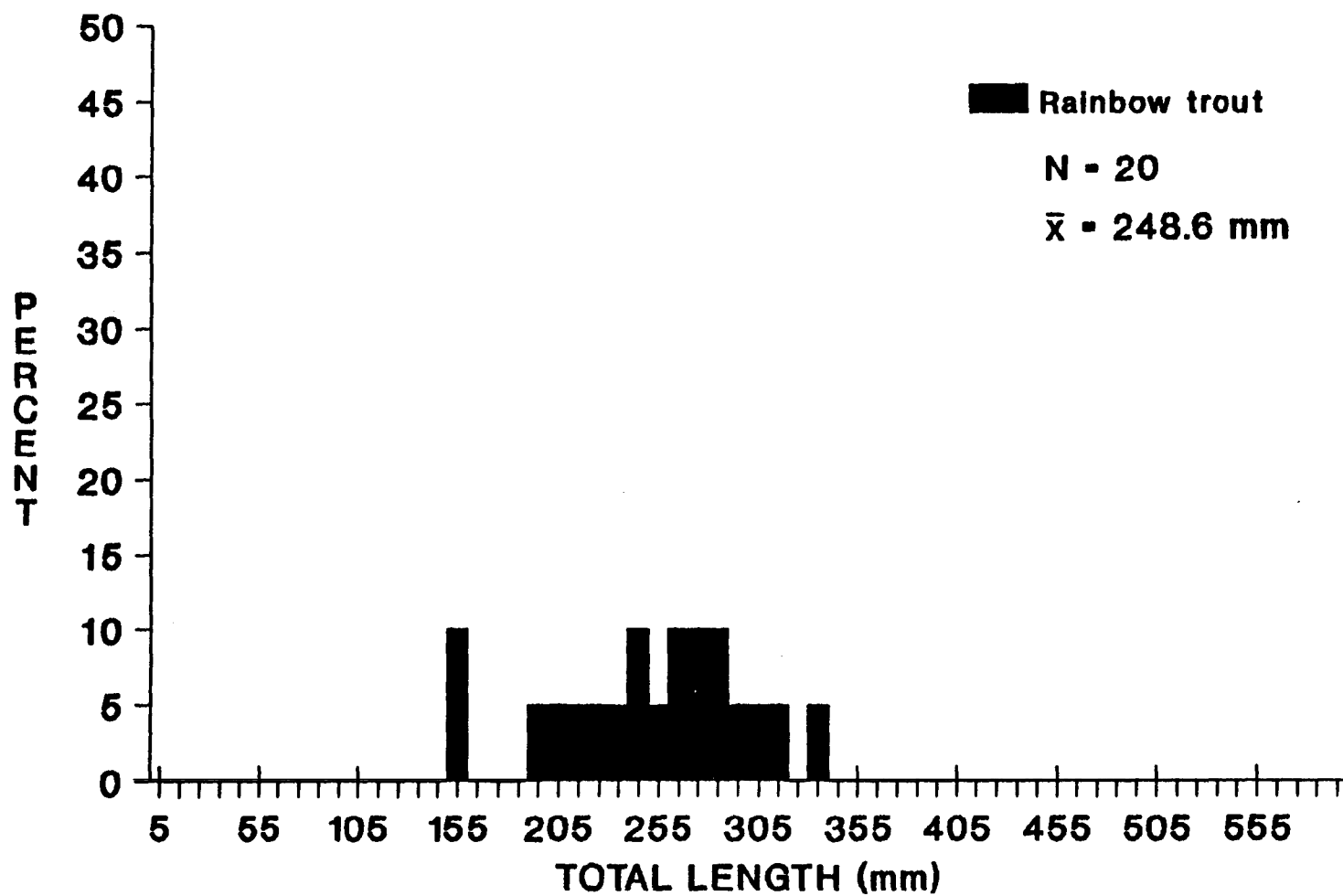


Figure 1. Length frequency of rainbow trout sampled in Clover Creek, October 16, 1989.

numerous small rainbow trout, dace sp., and sucker sp. were observed. A total of 46 rainbow trout, ranging from 48 to 253 mm (mean 150 mm), were measured (Figure 2).

King Hill Creek

On October 16, 1989, 20 wild rainbow trout were collected from approximately 50 m of King Hill Creek (NW1/4, NW1/4, Sec18, T3S, R11E). The stream section is accessible by hiking (1 km) into a deep canyon at the end of a four-wheel-drive road. In addition to the rainbow trout collected, sucker sp. and smaller rainbow trout were observed. The trout collected ranged from 155 to 240 mm, with a mean length of 198 mm (Figure 3). Condition (K) ranged from 0.75 to 1.03, with a mean of 0.88.

Vinyard Creek

On July 11, 1989, 30 wild rainbow x cutthroat trout Onchorhynchus mykiss x O. clarki from Vinyard Creek were collected. Fish collected ranged from 76 to 292 mm, with a mean of 148 mm (Figure 4).

Big Wood River

Brown Trout Redd Counts

On November 18, 1989, an annual count of brown trout Salmo trutta spawning redds in the Big Wood River above Magic Reservoir was made. A total of 67 redds were observed from the mouth of Rock Creek up to the confluence of the Glendale Diversion Canal (Davis Pond) (Table 1). One additional redd was observed in Rock Creek below Highway 20. Redd counts were considerably lower than in 1986-88, ranging from 34% of 1987 to 55% of 1986 counts. The decline is most likely due to the draining of Magic Reservoir in 1988 and 1989, due to low precipitation in the drainage. Additional impacts on the spawning fish could be due to the angler harvest on the fish during low stream conditions.

Deadman Gulch

On September 18, 1989, a 143 m section of Deadman Gulch was surveyed. The sample reach extended from the railroad trestle downstream in the NW1/4, SE1/4, Sec 18, T10S, R17E. The reach lies in private pasture land and is subject to grazing with the riparian vegetation consisting of grasses and some Russian olive shrubs. Aquatic vegetation is abundant and stream substrate consists of cobble and silt. Numerous numbers of Gammarus sp., Trichoptera, Diptera, and Ephemeroptera were observed in the stream. Stream flows are influenced by irrigation diversions and returns, with winter flows being substantially less than

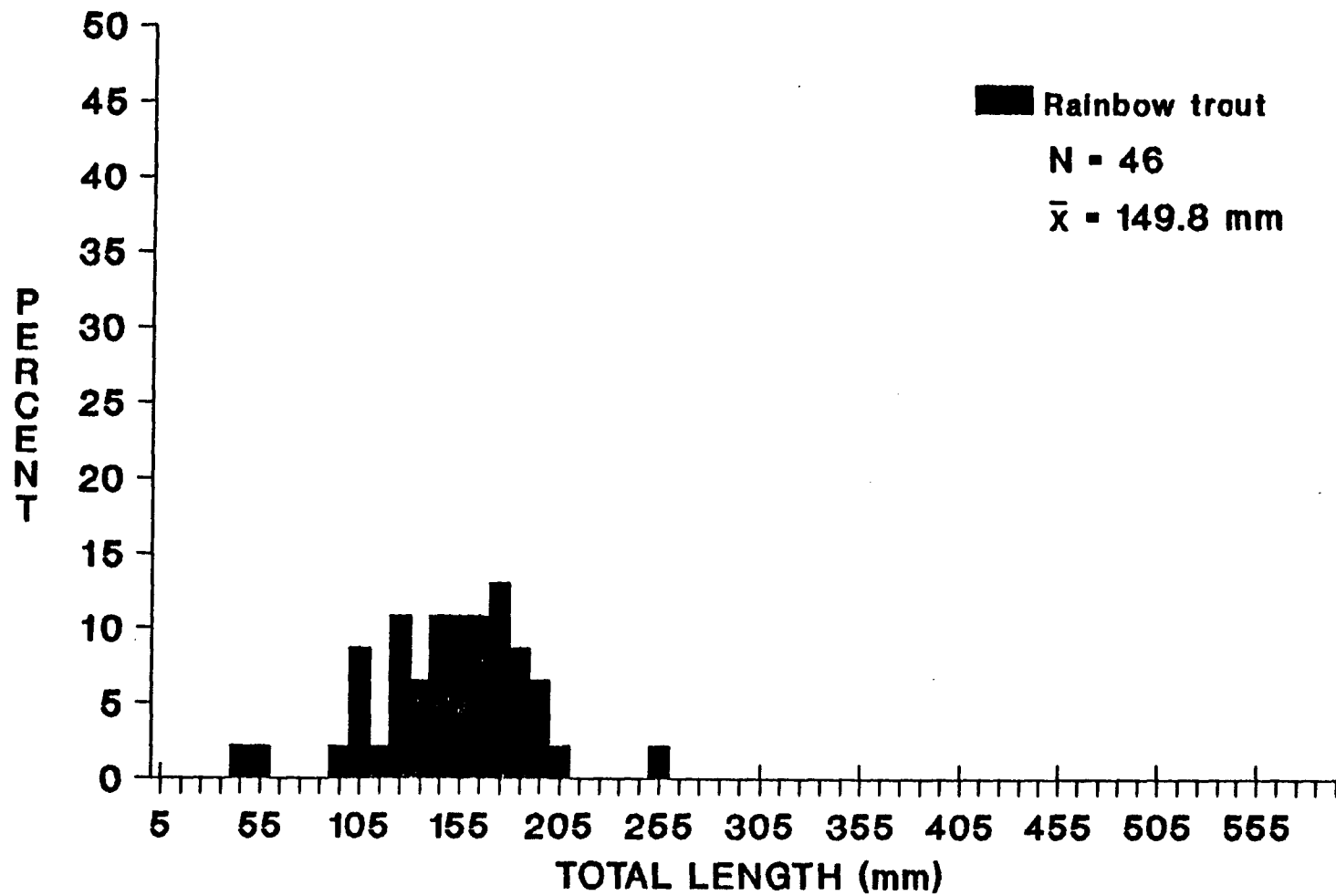


Figure 2. Length frequency of rainbow trout sampled in Dry Creek, July 12, 1989.

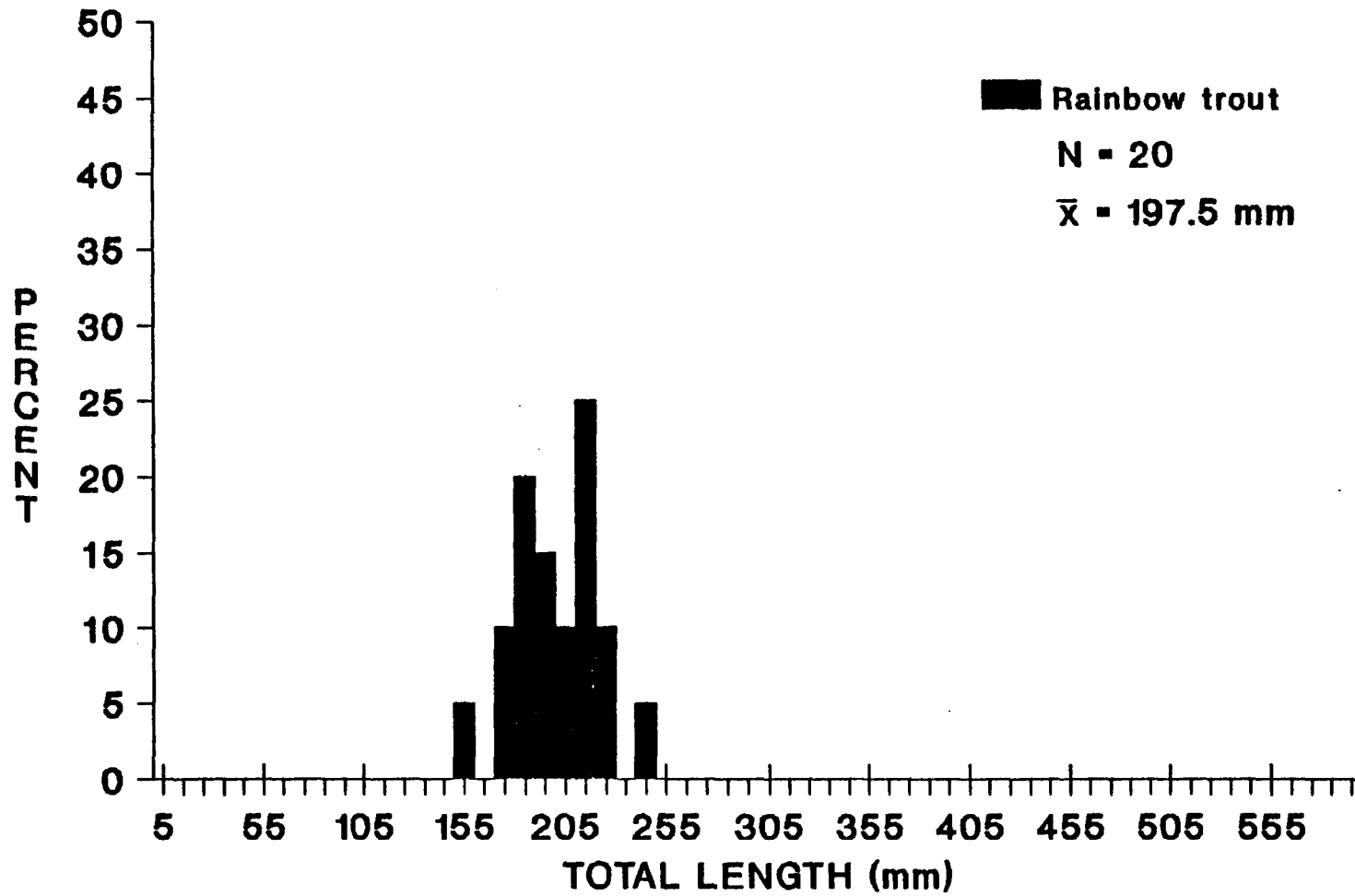


Figure 3. Length frequency of rainbow trout sampled in King Hill Creek, October 16, 1989.

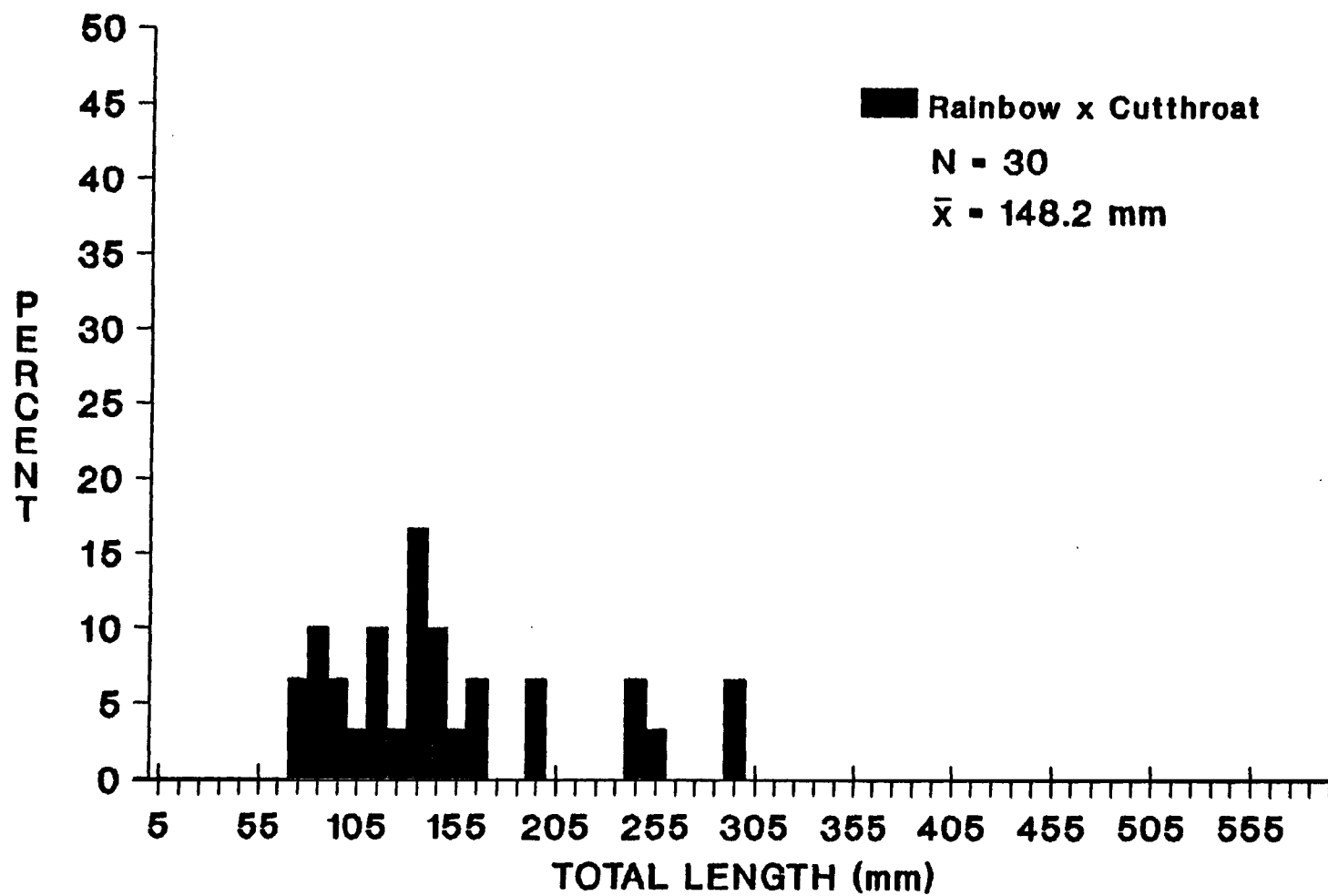


Figure 4. Length frequency of rainbow x cutthroat trout sampled in Vinyard Creek, July 11, 1989.

Table 1. Brown trout redd count on Big Wood River and Rock Creek above Magic Reservoir.

	Nov 19, 1986	Nov 19, 1987	Nov 15, 1988	Nov 18, 1989
Big Wood River				
Rock Creek-Sheep Bridge	--	104	13	6
Sheep Bridge-Fence (USGS st.)	26	62 ^a	75	20
Fence-Stanton Crossing	b	b	31	33
Stanton Crossing-Davis Pond	96	30	39	8
Total	122	196	158	67
Rock Creek				
Highway 20-Mouth	--	--	--	1

^aA total of 42 female brown trout were trapped and spawned at Hayspur Hatchery from this section.

^bCombined with previous reach.

summer flows. The flow was measured at 25.2 cfs at 4:30 PM. At the point of flow measurement, width was 4.0 m and depth averaged 0.26 m.

One pass through the stream reach with a backpack shocker collected :three wild rainbow trout and 89 mottled sculpin Cottus bairdi. Size of the rainbow trout was 145 mm, 32 g; 270 mm, 190 g; and 290 mm, 220 g. Two larger rainbow trout were also observed. Mottled sculpin ranged from 62 to 130 mm.

The major factor limiting trout production in the stream appears to be lack of suitable spawning habitat. Upstream movement of fish from Rock Creek into the stream is prohibited by a long culvert just above the mouth, and any instream gravels have been silted due to land use practices in the drainage.

Goose Creek

Following reports of low fish numbers, Department and USFS personnel sampled approximately 0.8 km of Goose Creek just upstream from the Idaho-Nevada state line, Sec 29, T16S, R19E, on August 24, 1989. This reach of stream has been impacted by flooding and considerable sediment movement in recent years due to thunderstorms and land management practices (logging and grazing) in the drainage. Riparian vegetation consists of grass and willow in fair to good condition. Stream substrate is predominately gravel and silts with some cobble/boulder. One active beaver pond is located in the reach.

A single pass through the stream reach with a backpack electrofisher found only five cutthroat trout Oncorhynchus clarki (some evidence of rainbow trout hybridization) and moderate numbers of redband shiner, dace sp., and sculpin sp. Size of cutthroat trout sampled was: 109 mm, 12 g; 125 mm, 14 g; 241 mm, 130 g; 291 mm, 295 g; and 338 mm, 405 g.

Grouse Creek

Grouse Creek is a small stream that drains into the South Fork Boise River approximately 8 km above Anderson Ranch Reservoir from the east (Figure 5). The drainage ranges in elevation from 1,334 m at its mouth at Paradise, Idaho to 2,334 m atop Grouse Butte. Soil type in the drainage is primarily granitic, and the predominant vegetation are conifer trees on the hillsides and willow in the riparian zone. Land ownership is predominately USFS and State of Idaho. Logging has occurred throughout the drainage. Stream substrate in the upper drainage is predominately gravel and sand (Table 2).

Department files on fish populations in the Grouse Creek drainage indicated that cutthroat trout were present. Since movement of fish from the South Fork Boise River into the drainage is restricted by the steep gradient found in the lower portion of Grouse Creek, it was felt that fish in the drainage may be unique. Preliminary examinations of the fish in Grouse Creek, which were undertaken in 1989, found the fish to most likely be redband or native rainbow trout. Future electrophoretic or DNA analysis will be needed to confirm the nature of the trout.

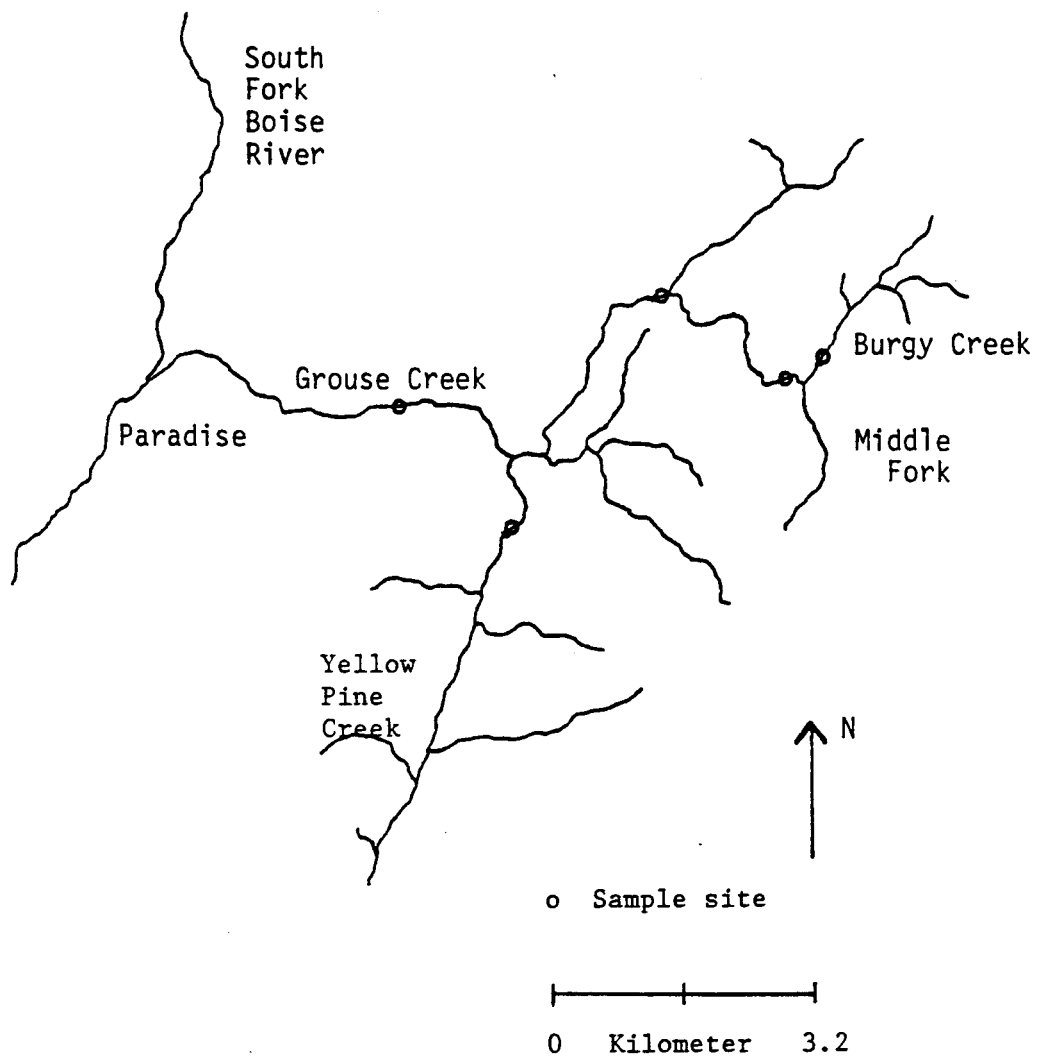


Figure 5. Location of stream sampling sites in the Grouse Creek drainage.

Table 2. Habitat and fish population data collected in the Grouse Creek drainage on August 9-10, 1989.

	Grouse Creek		Yellow Pine	Middle Fork	Burgy
	Section 1 ^a	Section 2 ^b	Creek ^c	Grouse Creek ^d	Creek ^e
Channel type	Confined	Confined	Entrenched	Meandered	Confined
Gradient (X)	4	2	6	2	5
Mean width (m)	2.27	1.56	1.07	1.68	0.92
Mean depth (cm)	9.4	6.5	5.1	8.7	3.1
Habitat (%)					
Pool	7	7	23	23	7
Run	80	93	73	67	90
Pocket water	0	0	0	0	0
Riffle	0	0	0	0	0
Back water	13	0	3	10	3
Substrate class (X)					
Sand	23	35	35	40	36
Gravel	24	58	65	50	64
Rubble	32	7	0	10	0
Boulder	15	0	0	0	0
Bedrock	6	0	0	0	0
Fish population					
Rainbow/100 m ²	6.02	14.02	0	27.34	3.57
Rainbow/100 m	13.67	21.87	0	45.94	3.28

^aSE1/4, SE1/4, Sec34, T3N, R10E

^bSE1/4, SE1/4, Sec25, T3N, R10E

^cNE1/4, SE1/4, Sec2, T2N, R10E

^dNE1/4, SE1/4, Sec31, T3N, R11E

^eSW1/4, NW1/4, Sec32, T3N, R11E

Five sites in the upper Grouse Creek drainage were sampled with a backpack electrofisher on August 9-10, 1989. A total of 42 wild rainbow trout were found in four of the sites. Based on single pass electrofishing samples, trout densities ranged from 3.3 to 45.9/100 m of stream (Table 2). Fish size ranged from 66 to 186 mm, with a mean of 108 mm (Figure 6). Condition (K) ranged from 0.66 to 1.28, with a mean of 0.90.

Little Wood River

Marked fish from three different strains of brown trout were released in the Little Wood River in 1987 and 1988 between the Dietrich Diversion and Silver Creek. In June 1987, 15,000 Plymouth Rock strain were marked with an adipose clip and released at 330/kg along with an additional 85,500 unmarked brown trout fingerlings. In April 1988, 11,269 Plymouth Rock (Max clip, 262/kg), 11,028 Spring Creek (L.V. clip, 121/kg), and 11,139 Big Wood (R.V. clip, 196/kg) brown trout were released, in addition to 47,200 unmarked fingerlings.

In 1989, marked fish in the Little Wood River were sampled during June and July with a Georator electrofisher and in August with a drift boat electrofisher. A total of 1,900 m of stream was sampled throughout the release area with the Georator, and two passes were made through the Bear Track research area (1,296 m) with the drift boat. A total of 153 brown trout were sampled, which included 14 marked fish. Eleven rainbow trout ranging from 144 to 275 mm, with a mean length of 219 mm, were also sampled.

Nine Plymouth Rock brown trout from the 1987 release were collected, which accounted for 22% of the 41 fish sampled in the 230 to 339 mm size. When released, this group made up 15% of the total hatchery release. Only one Plymouth Rock, two Big Wood, and two Spring Creek brown trout from the 1988 releases were sampled. When released, the three groups accounted for 41% of the hatchery release, but the combined sample collected in 1989 only made up 10% of the fish between 150 and 239 mm. When sampled in October 1988, 21 Plymouth Rock strain brown trout (1988 release) were collected, compared to only 5 Spring Creek and 3 Big Wood brown trout (Russ Thurow, Idaho Department of Fish and Game, personal communication). Additionally, 44 of the 404 total brown trout collected were Plymouth Rock strain from the 1987 release.

Although returns of hatchery brown trout released in 1987 and 1988 varied, it appears that hatchery releases are contributing a significant percentage of the brown trout in the Little Wood River. Marked fish from the 1987 release accounted for a higher percentage of the fish sampled from this year class than actually was released, indicating that hatchery releases may have accounted for almost all of this year class. While only 10% of the fish from the 1987 brood year class (1988 release) were found to be marked, the total hatchery contribution is estimated to be 24% of the fish sampled.

Mean size of the three strains released in 1988 was 212 mm (Big Wood), 208 mm (Spring Creek), and 224 (Plymouth Rock) at time of capture in 1989 (Figure 7). When released, they averaged 77, 90 and 75 mm, respectively, and in October 1988, 148, 167, and 148 mm. Plymouth Rock strain released in 1987 had a mean length of 278 mm in 1989.

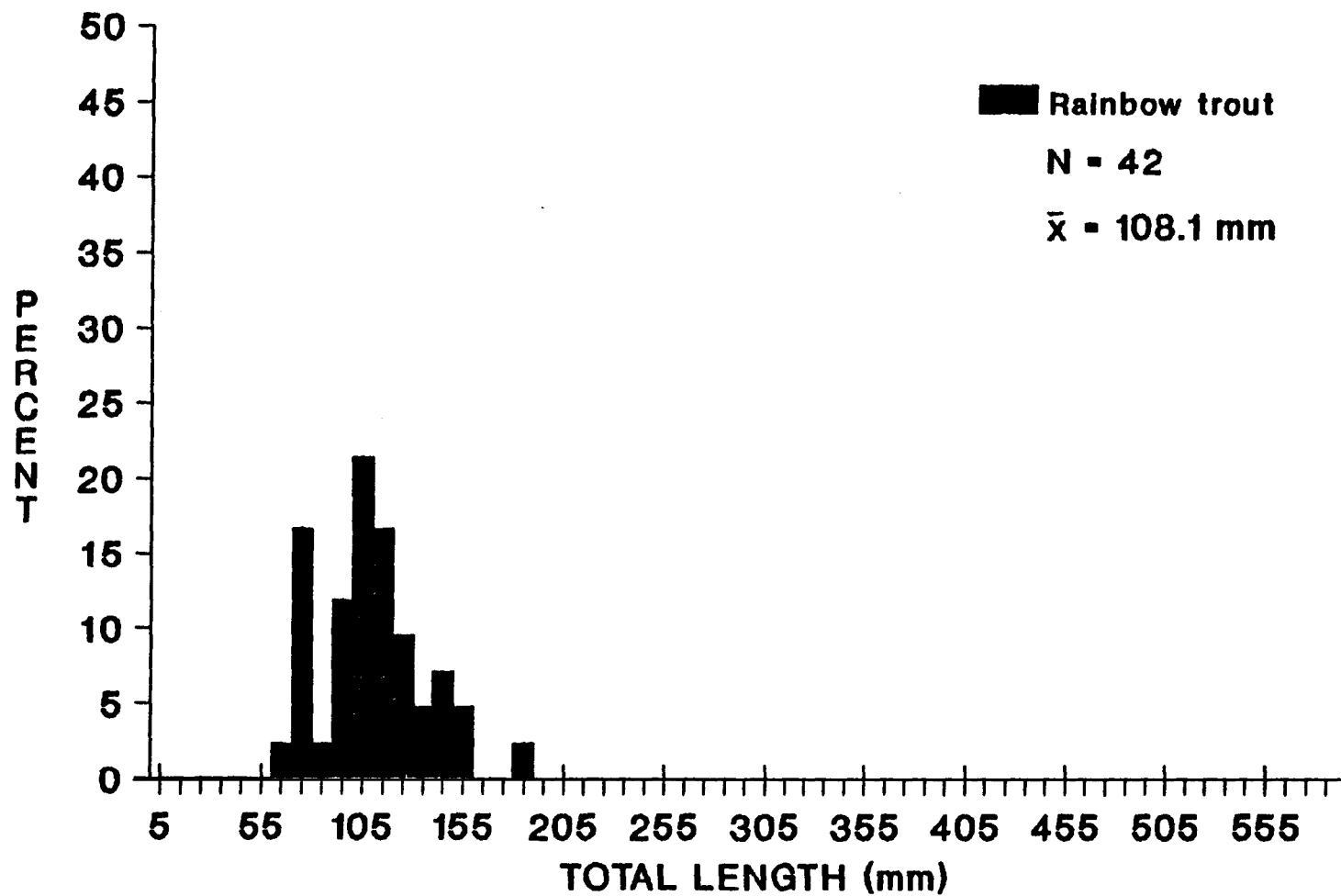


Figure 6. Length frequency of rainbow (redband) trout sampled in the Grouse Creek drainage.

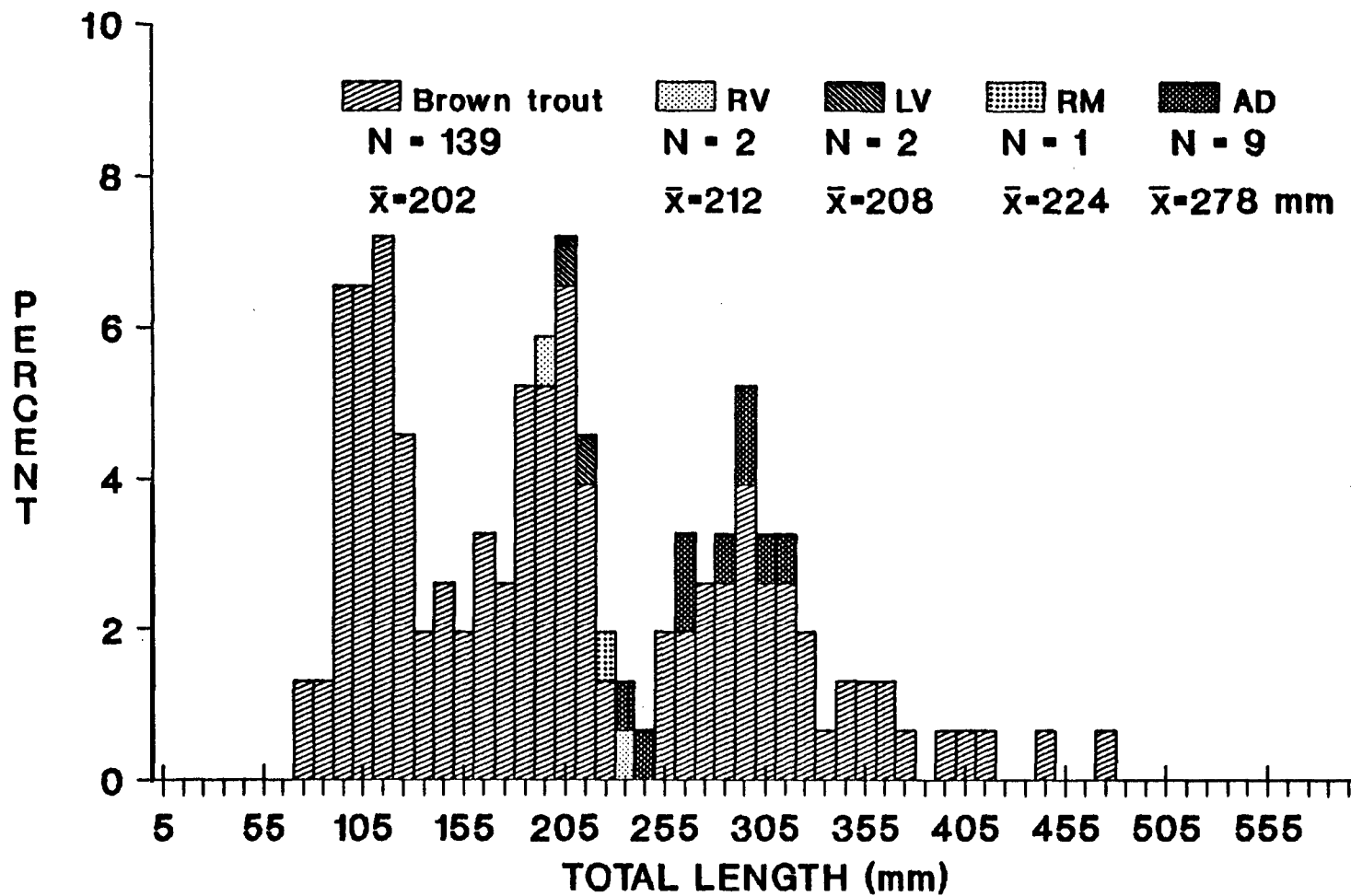


Figure 7. Length frequency of marked and unmarked brown trout sampled in the Little Wood River in 1989.

Rock Creek

Rock Creek in Blaine County is in the Big Wood River drainage, southeast of Bellevue, Idaho. It flows in a southerly direction and enters the Big Wood River at Magic Reservoir. The lower portion (0.7 km) of the stream below Highway 20 is inundated by the reservoir during years when the reservoir fills. The drainage consists of sagebrush covered hills with irrigated pasture and farmland in the valley bottom. Nearly all the land that the creek flows through is private. The Soil Conservation Service (SCS) is in the process of developing a soil and stream stabilization project on the stream similar to the Rock Creek Clean Water Program in Twin Falls County.

On July 25, 1989, fish populations in four sections of Rock Creek, Blaine County were sampled to provide baseline data for the SCS. A total of 31 wild and 10 hatchery rainbow trout, 3 brown trout, 91 dace sp., 117 redbside shiner, 23 sculpin sp., 45 sucker sp., and 20 yellow perch *Perca flavescens* were sampled (Table 3). Hatchery rainbow trout, brown trout, and yellow perch were only found below Highway 20 where the culvert appears to be an upstream migration barrier. Sections 2 and 3, in the middle portion of the stream, have been severely altered over the years to provide pasture and farm land, which predominately contained dace, redbside shiner, and suckers. Section 4 above the irrigation diversions had a good population of rainbow trout and sculpin.

Hatchery rainbow trout, which were sampled below Highway 20, ranged from 80 to 130 mm in length (mean 103 mm). These fish were from fingerling trout releases in Magic Reservoir in March and May, 1989. Due to hatchery and reservoir growth, these fish were midway in size between wild age 0 and age I rainbow trout (Figure 8). Two of the fish classified as wild trout in Section 1 were most likely hatchery fingerlings with good fin formation. Based on length frequency, wild rainbow trout sampled in Rock Creek showed at least three different age classes. Wild trout ranged from 30 to 253 mm, with a mean of 109 mm. Brown trout fingerlings were only sampled in Section 1 and were 65, 85, and 90 mm in length. Yellow perch sampled in the same area were all YOY.

Shoshone Creek

On October 30, 1989, fish populations in two adjacent sections of the South Fork Shoshone Creek (NW1/4, SW1/4, Sec16, T14S, R18E) were electrofished to provide baseline data for the USFS. Both areas are in the upper end of a riparian pasture that was created in 1989. The upper section, from the mouth of the Middle Fork up to the fence line, is approximately 100 m long and is in a deep (2-3 m) wash with some willow and shrub. Stream width ranged from 0.5 to 1.5 m. The lower section extends from the confluence of the South and Middle Forks downstream approximately 250 m to a large lodgepole pine. Stream width ranged from 2 to 4 m. Total lengths were recorded on all fish. Larger trout were weighed separately, and combined weights were taken on smaller trout and nongame species.

One pass through the upper section collected 7 rainbow trout, 3 mottled sculpin, and 174 dace sp. Rainbow trout had a mean length of 57 mm and ranged

Table 3. Fish sampled in four sites in Rock Creek, Blaine County, Idaho on July 25, 1989.

Stream section	Rainbow trout Wild Hatchery	Brown trout	Dace sp.	Redside shiner	Sculpin sp.	Sucker sp.	Yellow perch
1 ^a	8	10	3	7	0	0	20
2 ^b	8	0	0	65	117	0	0
3 ^c	0	0	0	19	0	3	0
4 ^d	15	0	0	0	20	0	0

^aNW1/4, SE1/4, Sec13, T1S, R17E. Pool below culvert under Highway 20, 8 m of stream.

^bNW1/4, Sec12, T1S, R17E. Immediately below county road, 30 m of stream.

^cSec23, T1N, R17E. Small beaver ponds, 0.4 km west of road, shocked three small ponds, 60 m total length.

^dNW1/4, SE1/4, Sec11, T1N, R17E. Started approximately 50 m above cattleguard, 60 m of stream shocked.

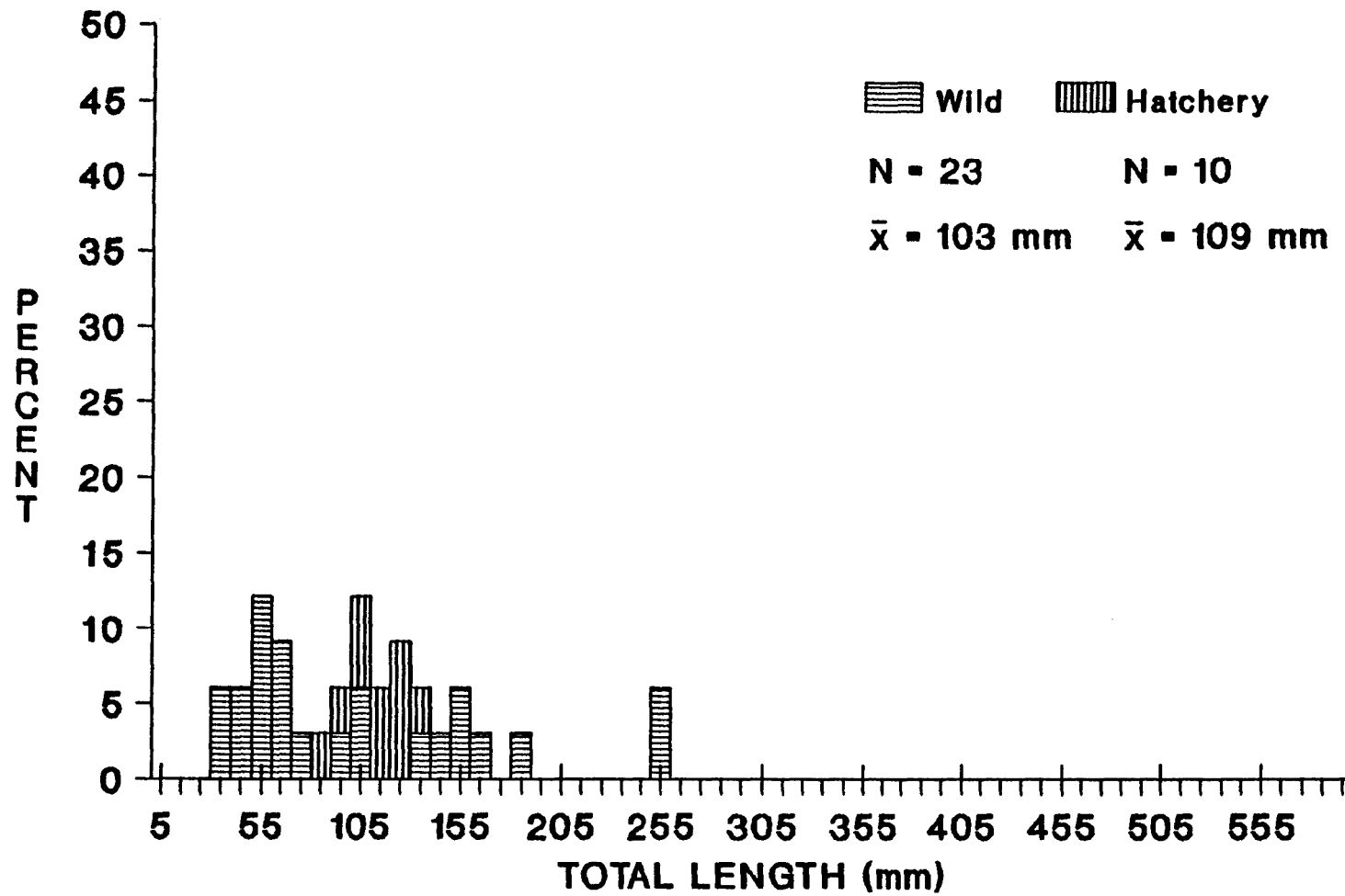


Figure 8. Length frequency of wild and hatchery rainbow trout sampled in Rock Creek, Blaine County, July 25, 1989.

from 50 to 62 mm and weighed a total of 12 g. The combined weight of the sculpin was 10 g and the dace, 290 g. In the lower section of stream, the electrofishing collected 50 rainbow trout, 439 dace sp., 72 bridgelip sucker Catostomus columbianus, 34 mottled sculpin, and 12 redbside shiner. Mean length of rainbow trout sampled was 114 mm, with a range of 54 to 212 mm (Figure 9). Mean weight was 19.6 g, with a range of 2 to 94 g. The combined weight of the other species was: dace sp., 755 g; mottled sculpin, 132 g; redbside shiner, 48 g; and bridgelip sucker, 96 g.

Silver Creek

On August 7, 1989, approximately 2 km of Silver Creek were sampled during a single pass with a drift boat electrofisher. The section sample was on private land upstream from the BLM Priest Campground in S1/2, Sec 7 and N1/2, Sec 18, T2S, R21E and started 30 m below the bridge and extended down to approximately 200 m above the BLM boundary. This area of Silver Creek has considerable amounts of willow and other shrubs along the stream banks. Fish sampling was predominantly aimed at larger (>150 mm) trout. Nongame species observed but not collected included dace sp., redbside shiner, and sucker sp.

Brown trout accounted for 80% of the 132 trout sampled, with wild rainbow trout making up the other 20%. Brown trout sampled ranged from 45 to 505 mm, with a mean length of 244 mm (Figure 10). A sample of 42 brown trout, from 100 to 505 mm, were weighed, with the mean weight being 299 g. The largest sampled was 1,100 g. Mean condition (K) for the 42 brown trout weighed was 1.07, with a range from 0.85 to 1.33. Rainbow trout sampled ranged from 123 to 328 mm, with a mean of 205 mm. Means for weight and condition were 135 g and 1.09, respectively, with condition ranging from 0.85 to 1.34.

Snake River

On November 1, 1989, a 1.8 km section of the Snake River was sampled with the electrofishing boat to collect rainbow trout for DNA analysis. Sampled area consisted of the south shoreline of the river from opposite the mouth of Clover Creek down to the pump station above the King Hill Bridge.

No trout were observed during the sampling, but the following fish were collected: 16 mountain whitefish Prosopium williamsoni, 1 smallmouth bass Micropterus dolomieu, 95 largescale sucker Catostomus macrocheilus, 3 bridgelip sucker, 10 carp Cyprinus carpio, 39 northern squawfish Ptychocheilus oregonensis, 42 peamouth Myclocheilus caurinus, 3 chiselmouth Acrocheilus alutaceus, 29 redbside shiner. The smallmouth bass was 165 mm in length, and the mountain whitefish ranged from 260 to 320 mm.

White Sturgeon Broodstock Collection

In order to continue a cooperative white sturgeon Acipenser transmontanus hatchery program between the Idaho Department of Fish and Game and the College

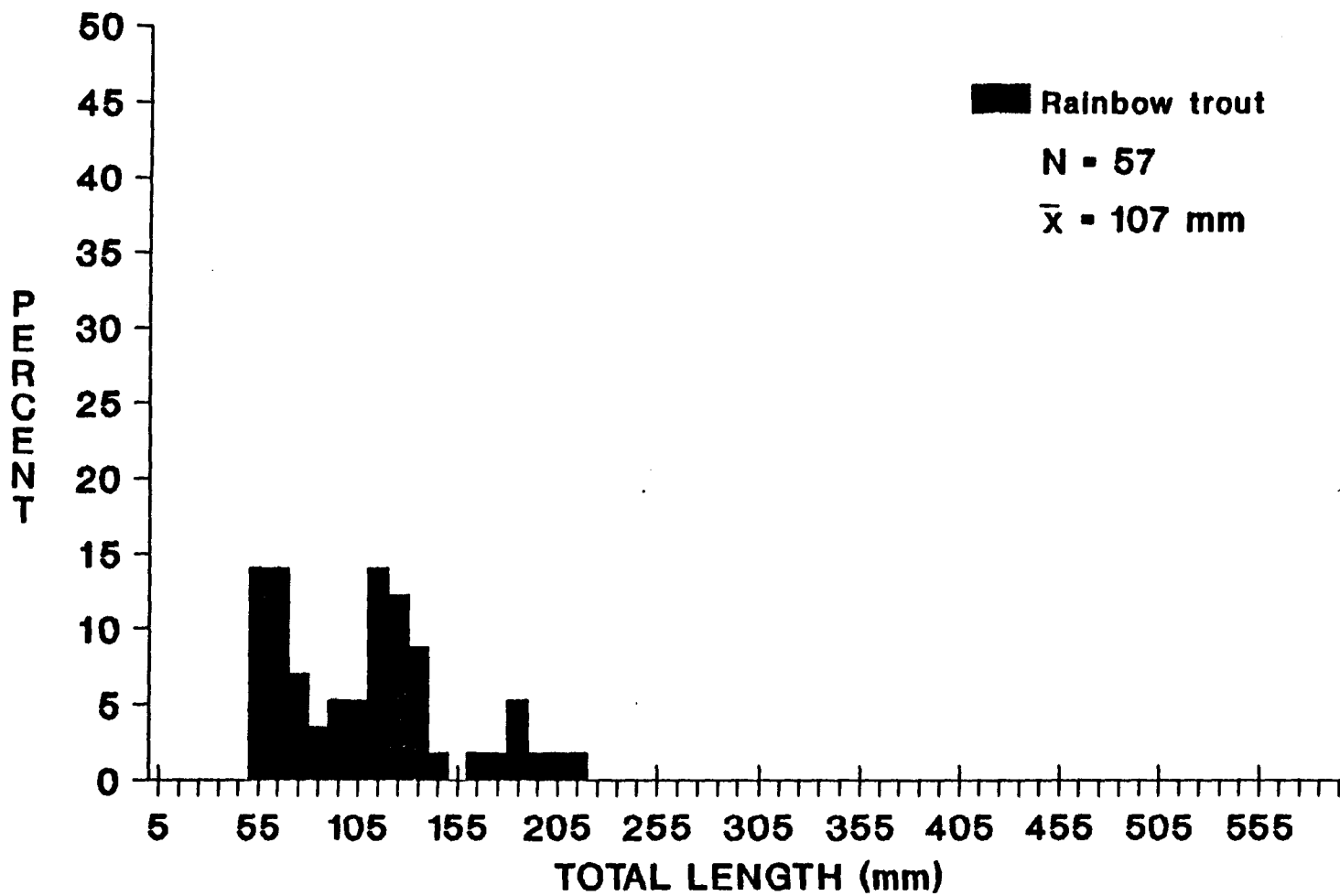


Figure 9. Length frequency of rainbow trout sampled in the South Fork Shoshone Creek, October 30, 1989.

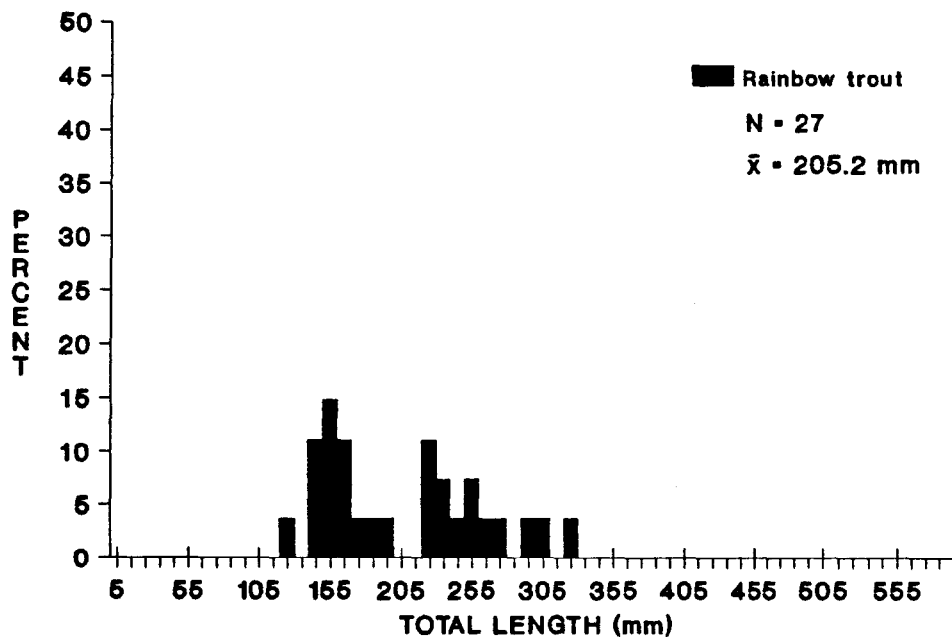
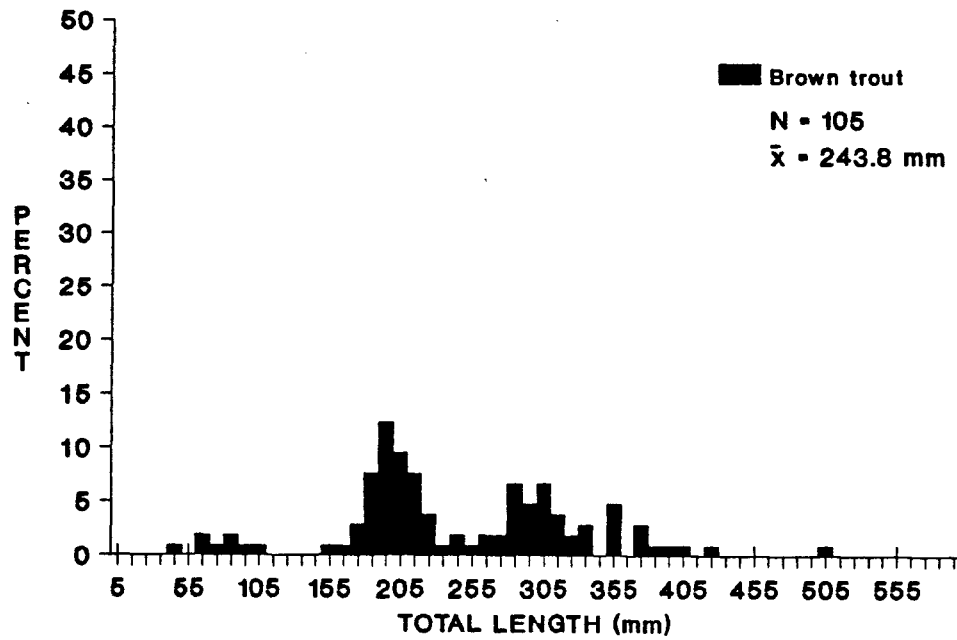


Figure 10. Length frequency of brown and rainbow trout sampled in Silver Creek, August 7, 1989.

of Southern Idaho (CSI), in conjunction with the Idaho Commercial Food Fish Industry, efforts were continued in 1989 to capture white sturgeon broodstock. From March into June, 1989, department and volunteer personnel fished a total of 453 rod, 2,173 set line, and 7 gill net hours for mature white sturgeon broodstock in the Snake River above C.J. Strike Reservoir. A total of 60 white sturgeon were captured, and 22 of the larger fish were surgically inspected to determine sex and spawning status. Twelve were determined to be male, four female and six were not classified (Appendix A). Of the four females, three were found to be at least two years prior to spawning and one was reabsorbing eggs from the previous year. The remaining female appeared likely to spawn in 1990 and was placed in the CSI hatchery for future broodstock. In addition, two mature males were also moved to the hatchery. The number (22) of larger white sturgeon in good condition captured and checked for sexual maturity was similar to 1987 (19) and 1988 (16) (Table 4).

As a result of a female white sturgeon captured in 1987, held at the CSI hatchery and spawned in 1988, the first release of cultured white sturgeon occurred in Idaho was on May 31, 1989 (Frew et al. 1989, Siple In Press). A total of 3,411 one-year-old white sturgeon were released in the Snake River between C.J. Strike Reservoir and Lower Salmon Falls Dam. All white sturgeon released were marked with a Passive Induced Transmitter (PIT) tag.

Willow Creek

Monitoring of fish populations in Willow Creek on the Marshall Ashcraft property was conducted on July 14, 1989. In addition to sampling the standard fish population site, backpack electrofishing samples were conducted in three additional areas to check for the presence of brown trout released in 1988.

A total of 92 wild rainbow trout were captured in the 198 m monitoring site, with fry (23-37 mm) accounting for 93.5%. The three larger rainbow trout were 153, 178, and 180 mm in length. Numbers of larger trout captured were insufficient to estimate a population density. Brown trout were not sampled. In comparison, 149 rainbow trout and 81 brown trout were sampled in this reach in July of 1988, and in November, 56 rainbow trout and 11 brown trout (Partridge et al. 1990).

An additional 300 m of stream in three different areas (Camp, Below Cherry Creek and 0.4 km below monitoring site) were electrofished to check for brown trout. Brown trout were not observed at any of the sites. A total of 30 wild rainbow trout (>100 mm) were sampled. Fry were observed in the lower area but not collected. The rainbow trout collected ranged from 135 to 225 mm, with a mean of 169 mm (Figure 11).

The reduction in fish numbers from 1988 is most likely due to low water levels that occurred in 1988 and 1989. The stream was intermittent in August 1989, which resulted in reduced fish numbers in November, and the low water may have increased winter mortalities. Additionally, brown trout fingerlings released on May 12, 1988 may have a tendency to migrate downstream after a summer in the stream.

Table 4. Number of white sturgeon caught during broodstock collection efforts in the Snake River above CJ Strike Reservoir, 1987-1989.

Year	White sturgeon captured	Number surgical checked		
		Female	Male	Undetermined
1987	63	8	10	1
1988	29	9	6	1
1989	60	4	12	6

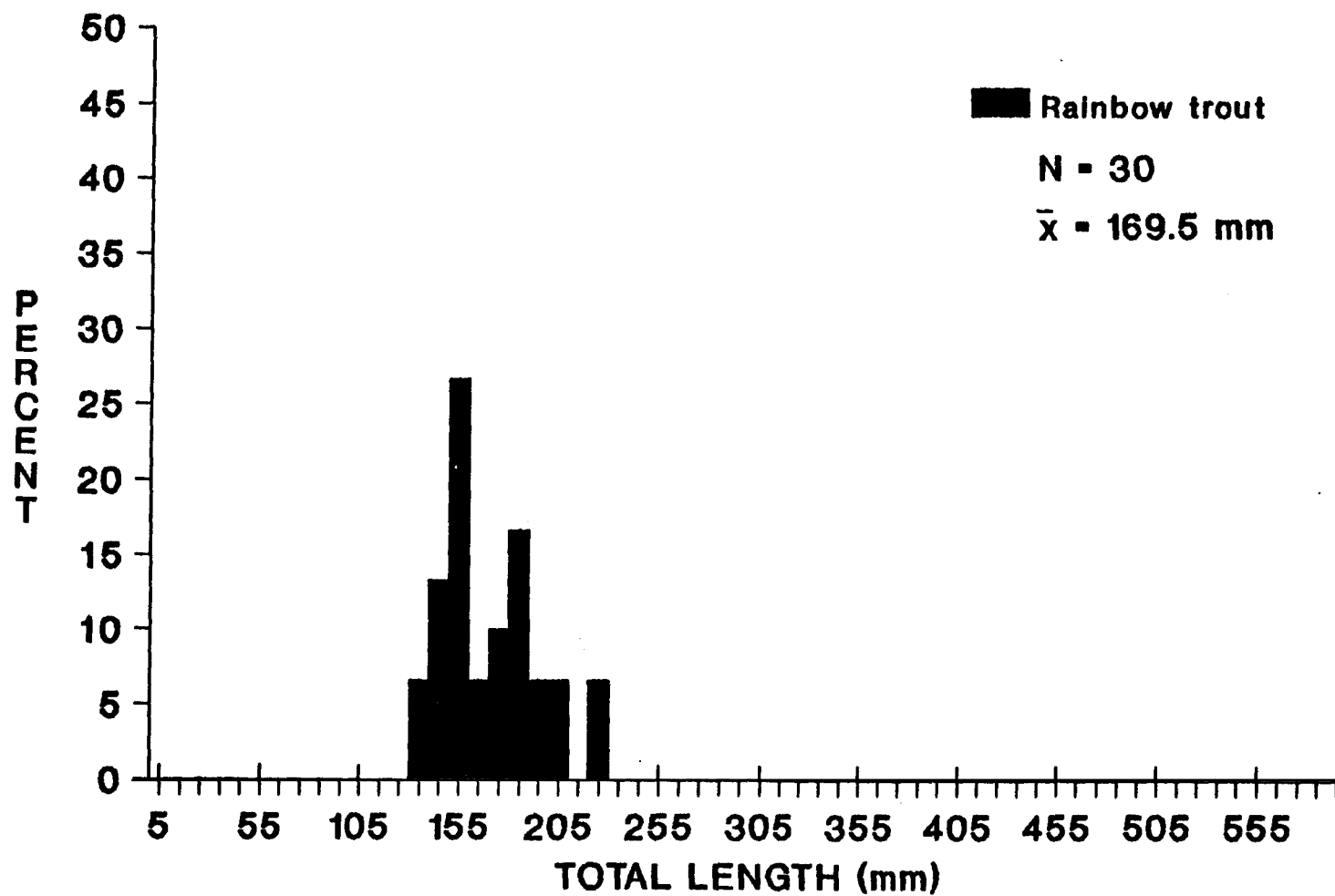


Figure 11. Length frequency of rainbow trout sampled in Willow Creek, July 14, 1989.

RECOMMENDATIONS

- 1) Determine native status of redband trout in Grouse Creek drainage through mitochondrial DNA analysis.
- 2) Continue to supplement trout populations in the Little Wood River with fingerling trout releases.
- 3) Work with the Department of Transportation to eliminate passage problems at Highway 20 on Rock Creek, Blaine County.

ACKNOWLEDGEMENTS

Funding for mitochondrial DNA analysis is provided by the Bureau of Land Management. Fishery technicians Mike Casten and Bryan Fuell assisted with data collection and analysis. Brown trout strain evaluations on the Little Wood River were designed and initially sampled by Russ Thurow, Senior Fishery Research Biologist. The white sturgeon culture program was set up and operated by Terry Patterson, College of Southern Idaho Hatchery Coordinator.

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APPENDIX

Appendix A. Length, sex, and spawning condition of white sturgeon caught in the **Snake** River between C.J. Strike and Bliss **dams** in 1989.

Date	Location	Total length (cm)	Fork length (cm)	Sex ^a	Spawning ^b condition
3/25	NARROWS	132	--		
3/25	NARROWS	137	--		
3/25	NARRPWS	198	--	M	U
3/31	CJ STRIKE	128	113		
3/31	CJ STRIKE	183	168	M	U
3/31	CJ STRIKE	160	139	M	U
4/01	CABIN AREA	188	--		
4/01	CABIN AREA	66	--		
4/02	BLISS DAM	196	174	U	U
4/06	CJ STRIKE	190	185	M	R
4/08	NARROWS	81	72		
4/08	NARROWS	66	58		
4/08	NARROWS	58	55		
4/08	NARROWS	62	57		
4/08	NARROWS	55	61		
4/08	NARROWS	74	65		
4/13	CABIN AREA	175	170	U	U
4/13	CABIN AREA	91	83		
4/13	CABIN AREA	183	159		
4/14	CABIN AREA	198	183	F	0
4/14	CABIN AREA	175	157	U	U
5/15	CJ STRIKE	245	204	M	R
5/16	CJ STRIKE	169	146	M	U
5/16	CJ STRIKE	223	205	U	U
5/16	CJ STRIKE	178	152	M	U
5/16	CJ STRIKE	165	149	M	U
5/16	CJ STRIKE	81	--		
5/17	CJ STRIKE	184	166	M	U
5/17	CJ STRIKE	215	200	F	U
5/17	CJ STRIKE	115	102		
5/17	CJ STRIKE	190	152	M	R
5/17	CJ STRIKE	116	107		
5/17	CJ STRIKE	128	116		
5/24	CJ STRIKE	205	182	M	U
5/24	CJ STRIKE	202	185	M	U
5/24	CJ STRIKE	125	--		
5/24	CJ STRIKE	115	--		
5/24	CJ STRIKE	163	--		
5/24	CJ STRIKE	152	--		
5/25	CJ STRIKE	157	149		
5/25	CJ STRIKE	204	187	U	U
6/02	CJ STRIKE	136	--		
6/02	CJ STRIKE	124	115		
6/02	CJ STRIKE	141	--		
6/02	CJ STRIKE	222	197	F	M

Appendix A. Continued.

Date	Location	Total length (cm)	Fork length (cm)	Sex ^a	Spawning ^b condition
6/06	CJ STRIKE	133	--		
6/06	CJ STRIKE	79	--		
6/06	CJ STRIKE	93	--		
6/06	CJ STRIKE	221	204	F	U
6/06	CJ STRIKE	144	--		
6/07	CJ STRIKE	80	--		
6/07	CJ STRIKE	189	169	U	U
6/07	CJ STRIKE	146	--		
6/07	CJ STRIKE	121	--		
6/09	CJ STRIKE	72	--		
6/09	CJ STRIKE	92	--		
6/09	CJ STRIKE	86	--		
6/23	CJ STRIKE	91	--		

^aOnly potential spawners checked. M-Male, F-Female, U-Undetermined.

^oU-Undetermined or immature, R-Ripe, 0-Reabsorbing eggs, M-Mature.

JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management
Investigations

Project No: F-71-R-14

Job No.: 4-d

Title: Region 4 Technical Guidance

Period Covered: July 1, 1989 to June 30, 1990

ABSTRACT

Region 4 fishery management personnel provided technical guidance to state and federal agencies and private individuals. Comments on 175 documents were included in this guidance work.

A significant portion of the regional time was related to activities in the Wood River drainage, including working and commenting on stream alterations, stream rehabilitation projects, the *highway* realignment project, hydro power activities, and fishing regulations.

Author:

Fred E. Partridge
Regional Fishery Biologist

89REPORT

OBJECTIVES

- 1) To furnish technical assistance, advice, and comments to other agencies, organizations, or individuals regarding any items, projects, or activities associated with, or that may have an impact on, the fishery resource or aquatic habitat of the Region.
- 2) To comment upon environmental impact statements, environmental analysis reports, discharge permits, and proposed or existing hydropower projects or similar items. To participate in the Department of Fish and Game's fish and wildlife resource planning.

METHODS

Reviews, field inspections where necessary, comments, expertise, advice, and recommendations were furnished upon request to all governmental and private *organizations* and individuals. Numerous meetings and hearings were attended, and prescriptions were given when requested or necessary.

RESULTS

Fishery management personnel in Region 4 responded to the following requests for comments from various agencies and individuals:

Federal Energy Regulatory Commission	36
Idaho Department of Water Resources	75
Bureau of Land Management	18
U.S. Forest Service	7
U.S. Army Corps of Engineers	2
Idaho Division of Environmental Quality	6
U.S. Fish and Wildlife Service	5
Miscellaneous	26
TOTAL	175

Big Wood River

Activities in and around the Big Wood River drainage accounted for a larger percentage of regional fishery personnel time than the rest of the region combined. During 1989, we worked with other agencies and entities on the Big Wood River stream stabilization project, Highway 75 realignment project, monitored dissolved oxygen levels in the river associated with Magic Hydro operations, and commented on numerous stream alterations and water rights applications.

During 1988, the Idaho Fish and Game Commission began to respond to requests by members of the public to alter fishing regulations on the Big Wood River and Silver Creek to increase the amount of trophy fishing water. Since a current research project on fish populations in the Big Wood River indicated

that the river between the Glendale Diversion and Warm Springs Creek had the potential for producing a *significant* number of trophy size (>400 mm) rainbow trout Oncorhynchus mykiss (Thurrow 1990), the Commission requested that the Department begin the process of changing regulations to provide additional quality fishing water. In March, 1989, the Department held public hearings on a variety of proposed sets of regulations in Burley, Twin Falls, Boise, and Hailey. Approximately 400 people attended the four hearings, and additional comments were received in the form of letters and petitions. Based on the extensive public input and the biological data, the Department presented their recommendations to the Commission. Due to the complexity of the regulation proposals, the Commission modified the Department's proposals, creating longer areas of catch-and-release and slot limit regulations than had been discussed in the public meetings or in the Department's proposals. These new regulations were to go into effect in May, 1989. Prior to the opening of fishing in May, a group of anglers in favor of allowing bait fishing formed the Idaho Sportsmen Association. This association asked for and received an injunction against the regulation changes on the Big Wood River and Silver Creek due to procedural and social issues. With the injunction in place, the established 1988 and 1989 regulations were left in place. The Commission then reset the new regulations with a modification in the boundary line between catch-and-release and slot limit areas on the Big Wood River. This change went into effect on October 1, 1989, one month prior to the end of the fishing season.

The new regulations for the Big Wood River and Silver Creek, which were set in the fall of 1989, were incorporated into the 1990 and 1991 fishing regulations. With the possibility of additional legal action by the Idaho Sportsmen Association, the Commission requested that the Department see if a compromise could be reached. Early in 1990, a compromise was agreed to which reduced the area in catch-and-release on Silver Creek and modified the gear restrictions in the slot limit waters on both the Big Wood River and Silver Creek. The Commission then established these regulations prior to the 1990 fishing season opener.

Miscellaneous Activities

- 1) We assisted the Division of Environmental Quality personnel on the Rock Creek Rural Clean Water project.
- 2) We are participating in the interagency cooperative project to restore Crystal Lake.
- 3) We worked with the Walleye Club and other interested sportsmen on the fish habitat (Christmas tree) project in Salmon Falls Creek Reservoir.
- 4) We participated in a U.S. Fish and Wildlife Service Delphi exercise to develop habitat suitability curves for white sturgeon Acipenser transmontanus.

RECOMMENDATIONS

Technical guidance and assistance related to the fishery resource of Region 4 should be continued on an annual basis.

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ACKNOWLEDGEMENTS

Robert J. Bell retired in September, 1989, after 24 years as the Region 4 Fishery Manager and 35 years with the Department. During most of 24 years as the Region 4 Fishery Manager, he was the only person standing in the way of those who wished to degrade fish and wildlife habitat for their personal gain. His knowledge of the region and expertise in fishery biology allowed him to maintain and improve the regional fisheries throughout this period. We would like to express our thanks for his dedication and wish him well in his retirement.

LITERATURE CITED

Thurrow, Russ. 1990. Wood River fisheries investigations. Idaho Department of Fish and Game. Job Completion Report. Project F-73-R-12. Boise.

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